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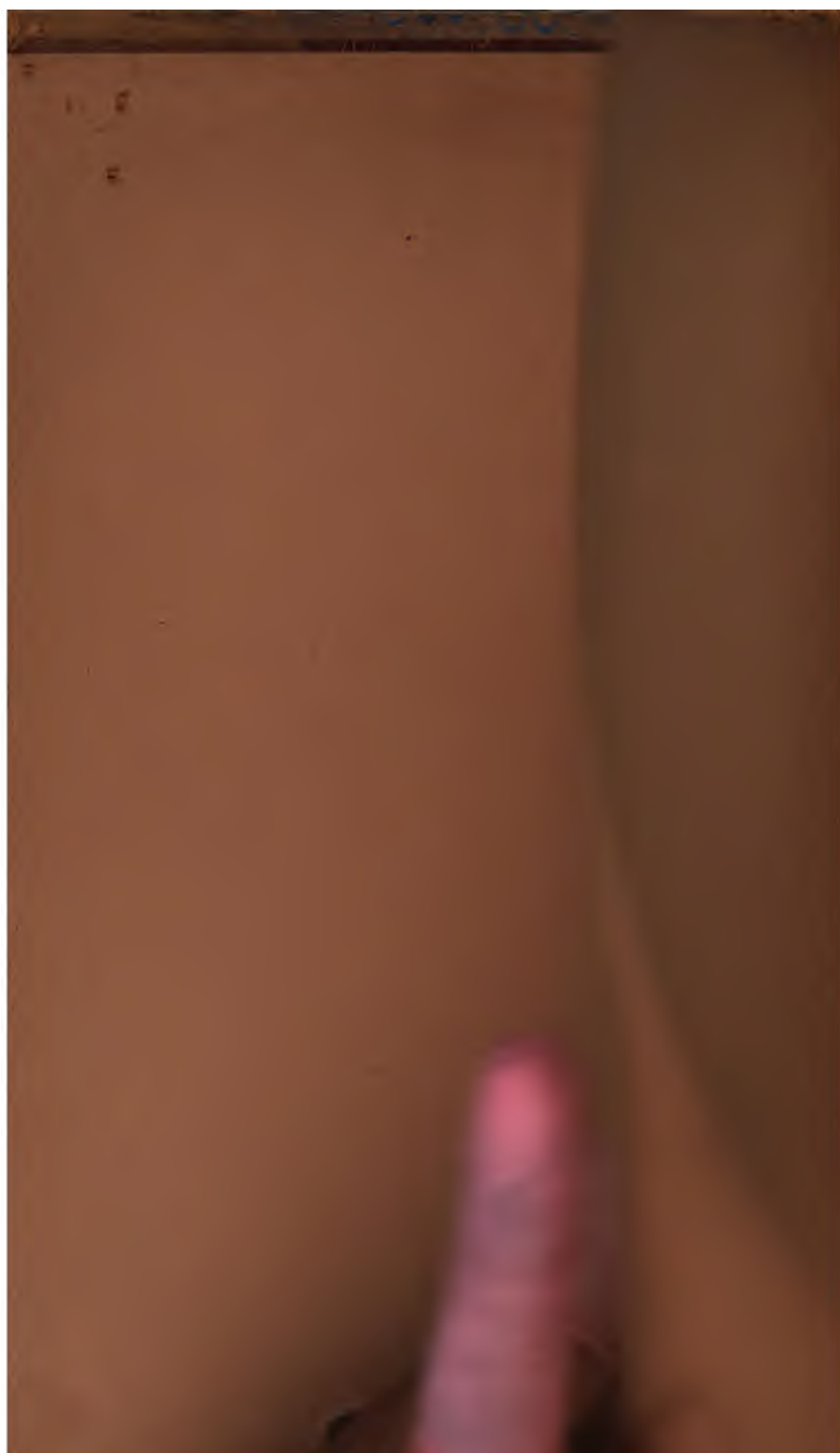
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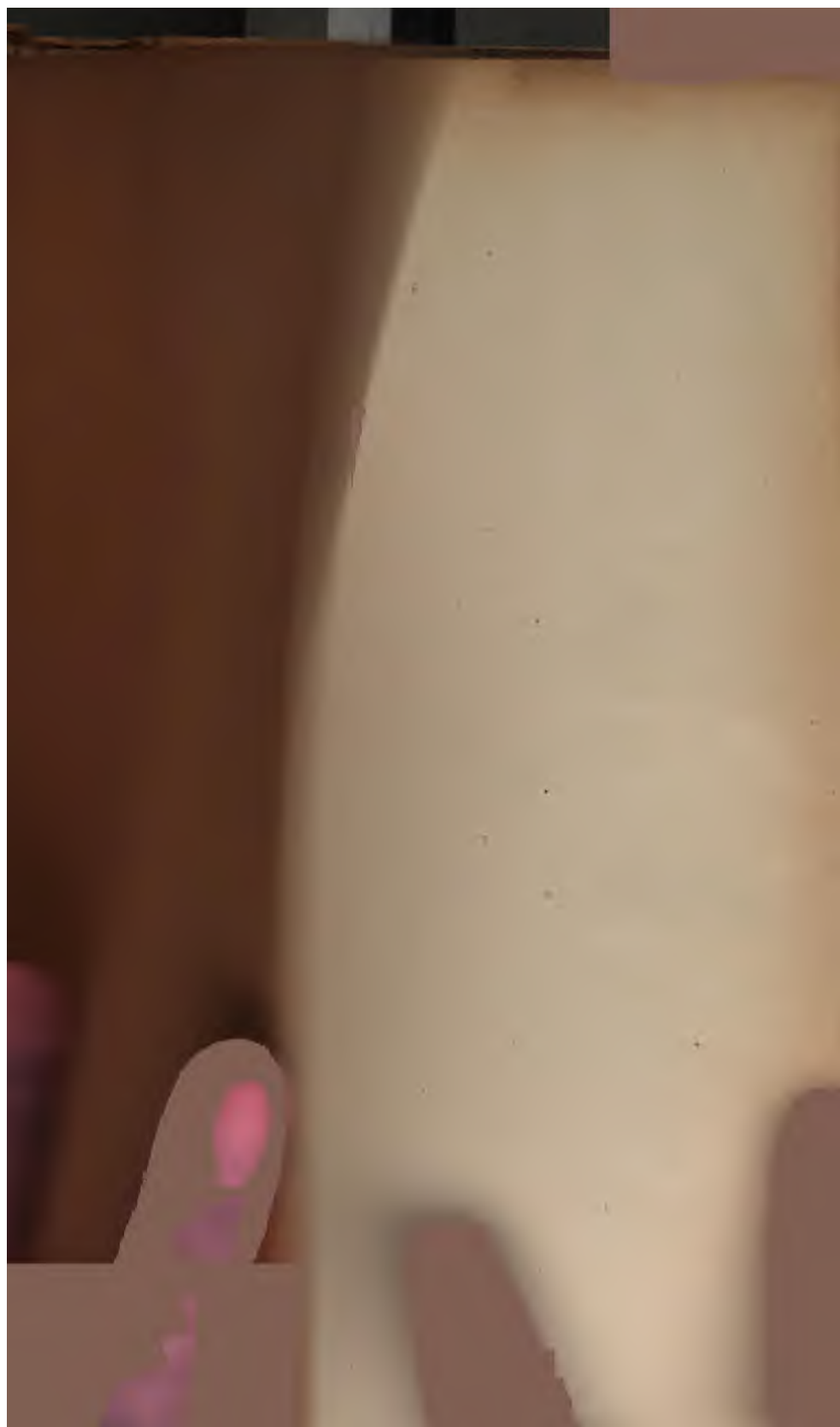


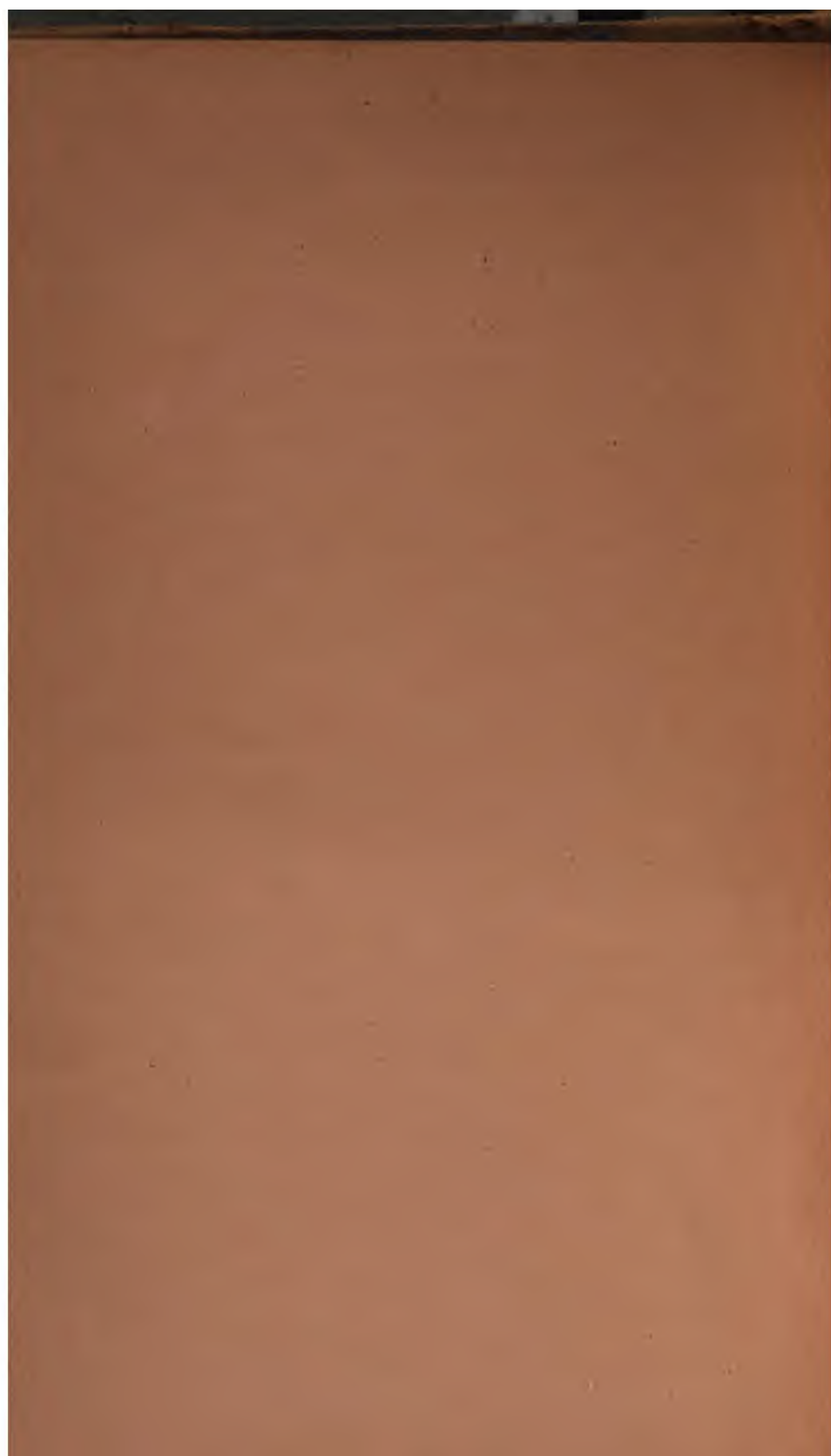
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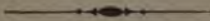
OF THE

UNITED STATES NATIONAL MUSEUM.

NO. 17.—ON THE ZOOLOGICAL POSITION OF TEXAS.

BY

EDWARD D. COPE.



WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1880.

Department of the Interior:

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BULLETIN

OF THE

UNITED STATES NATIONAL MUSEUM.

No. 17.

PUBLISHED UNDER THE DIRECTION OF THE SMITHSONIAN INSTITUTION.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1880.



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ADVERTISEMENT.

This work is the twentieth of a series of papers intended to illustrate the collections of natural history and ethnology belonging to the United States, and constituting the National Museum, of which the Smithsonian Institution was placed in charge by the act of Congress of August 10, 1846.

It has been prepared at the request of the Institution, and printed by authority of the honorable Secretary of the Interior.

SPENCER F. BAIRD,

Secretary of the Smithsonian Institution.

SMITHSONIAN INSTITUTION,

Washington, May, 1880.

ON THE
ZOOLOGICAL POSITION
OF
TEXAS.

BY
EDWARD D. COPE.



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ON THE ZOÖLOGICAL POSITION OF TEXAS.

By E. D. COPE.

The relation of the nearctic and neotropical faunæ at their point of junction is as yet a problem not fully solved. Where there is placed between the two an obstacle to migration of land and fresh water animals, as between the Gulf coast of the United States and the islands of the West Indies, the differential characters of the faunæ are well marked; but where the northern continent gradually passes into the long isthmus of Mexico, the case is far different. Here no barrier obstructs the passage of animals from the one region to the other, and nothing but climatic and meteoric causes can limit the range of the types of either fauna. A careful investigation of this subject must have an important bearing on the whole subject of the influence of environment on animal life.

In general the studies into the zoölogy of Mexico have shown conclusively that the high plateau is populated by an animal life which differs from that of the coastward plains, or Tierra Caliente. The highest land is known as the Tierra Alpina, and the intermediate region is the Tierra Templada. As residents of the land incapable of performing migrations, the *Batrachia* and *Reptilia* offer the most excellent field for the determination of the boundaries of these districts.

From this source we learn that the line of demarkation between the great Northern and Southern realms is the very sinuous and irregular one which separates the Tierra Caliente from the Tierra Alpina. The genera of South America advance northwards along the lower lands of Central America and Mexico, terminating their range at various points, but enough of them remain at Matamoras, at the mouth of Rio Grande, to show that that point is not far from the northern boundary of the neotropical realm. On the other hand, various genera of the southern regions of North America extend their range southward as far as the city of Mexico. This southern extension is not homogeneous in its character, since two very distinct groups of reptilian life are represented on each side of the political boundaries of the two countries. In North

America proper, there are the two regions called respectively the Austroriparian and the Sonoran, which are, climatically considered, of the most diverse character.* The Austroriparian region is humid, abounding in streams, and is covered with forests. Many species of *Batrachia* are found within its limits, some of which represent families unknown to any other region of the earth. Water-tortoises and snakes are numerous in species and genera, while the lizards have but few representatives. The Sonoran region, embracing the elevated countries of New Mexico and Arizona, is dry, with little vegetation, and a small number of springs and rivers. *Batrachia* and water-tortoises are few in species and individuals, while lizards and snakes are numerous in both. This region, if characterized by its climatic and surface characters, has considerable extent. It commences south of the center of Oregon, and, extending southward, embraces Nevada and Utah. Passing the Mexican boundary we find the sage-brush-desert plateau east of the Sierra Madre, the continuation of the Sierra Nevada, covering the greater part of Chihuahua, Coahuila, and Durango, and extending apparently as far to the southward as Guanajuato, or more than half of the entire extent in latitude of the Mexican Republic. At this point are found its characteristic desert *Batrachia*, *Bufo punctatus* B. & G., *B. debilis* Gird., and *Spea hammondi* Bd. On the west coast, genera and species of the same region have been found as far south as Mazatlan, such as *Bufo debilis*, *Sauromalus ater*, *Uta bicarinata*, &c.

On the eastern coast no trace of the Sonoran Fauna has been found. The low country, as already remarked, belongs to the northern extension of the neotropical realm. This is separated from the barren plateau of Coahuila and Durango by a mountainous region whose intermediate elevation gives it the character from which it derives its name, the Tierra Templada. Its width, at first small, increases southward, where it expands so as to include, in all probability, the beautiful valley of Mexico. No corresponding belt of identical faunal character can be determined on the western side of the plateau, since in Mexico as in the continents which she connects, the Cordillera approaches near to the Pacific, and the descent to the coast is rapid and abrupt. The Tierra Templada is a garden region. Elevated above the hot lowlands of the coast, the clouds from the Gulf discharge their burthen of rain on its mountains and valleys, giving life and support to a varied vegetation. The reptilian fauna of this region is in direct contrast with that of the

* See Check-List Batr. Reptil. N. America, 1875, p. 68, Bulletin Natl. Museum No. I.

dry regions to the westward of it. Like the Austroriparian region of North America it abounds in *Batrachia*, including salamanders; turtles also, though less numerous, are well represented; and lizards and snakes abound. The salamanders mostly belong to a genus, *Spelerpes*, which has its headquarters in North America, and several genera of North American snakes and lizards are abundant there, but they are so mixed with forms of the Tierra Caliente that I regard these districts for the present as faunally inseparable.

Having fixed approximately at some points the southern boundaries of the Sonoran and Austroriparian regions of the nearctic realm, the mutual relations of these divisions remain to be considered. And in connection with these we must endeavor to fix the southern limit of the Central region also, whose southern extremity is bordered by both of those above mentioned. It is needless to say that the great State of Texas is the field where these boundaries must be sought for; since, though politically one, its fauna is of a most diversified character.

Geologically, it was shown by Shumard to be divided, like the Eastern States, by northeast and southwest strikes. If a line is drawn through points a little west of the cities of Dallas and Houston, it will correspond nearly with the strike of the eastern border of the marine cretaceous formation, which constitutes so large a part of the surface of Texas. To the eastward of this line a belt of the Laramie formation extends from the northeast and terminates at the south, without continuing immediately to the west, according to Forshey. East of this the formations of the country are altogether tertiary. The marine cretaceous of Northern Texas soon yields on the west to carboniferous beds which rise from beneath them. These again descend, according to the geologists who have reported on the subject, and are followed by an extensive area of overlying rocks of permian and triassic age. But these formations alike disappear to the southward and are replaced by the western extension of the marine cretaceous. This formation covers a great extent of country in Western Texas, reaching from the latitude of San Antonio, far north into the Staked Plains and New Mexico.

Topographically speaking, Eastern Texas is a plain varied by mounds of red sand of late tertiary age, and by ravines and shallow valleys of erosion. Extensive prairies cover the foundation of Laramie and marine cretaceous throughout the eastern middle line of the State. The first line of elevation is formed by a break in the latter formation. An abrupt elevation commences somewhere to the southwest of Fort Worth

and continues southward and westward, passing close to Austin, the State capital, and within twenty miles of the city of San Antonio, extending westward to the valley of the Rio Grande. The portion of the limestone thus elevated is said to be older than that which occupies the adjoining lowlands, being correlated by some geologists with the No. 2 of Meek and Hayden, while the lower part of the formation is said to represent their No. 3. Without criticizing these determinations, it may be observed that the fault which should exist, if this identification be true, has been observed at various points along the line of elevation. I found it crossing the Helotes Creek eighteen miles from San Antonio at a locality pointed out to me by Mr. Gabriel W. Marnock.

This steppe of elevation is from five to eight hundred, and occasionally a thousand feet in height. Its summit is a greatly interrupted plain, which extends northward to near the Concho River, having a width of nearly two degrees of latitude. Here another elevation takes place, followed by a plain which extends away to the next ascent, which forms the southern boundary of the Staked Plains. The eastern and southern border of this plateau is 3,000 feet above the sea level,* and an ascent of another thousand feet is accomplished before the eastern boundary of New Mexico is reached.

The rivers of Texas, from the Trinity westward, take their rise at or near the first, second, and third lines of elevation above mentioned. Much the greater number of important streams originate in the region between the first and second steppes of a thousand feet each. This plateau is therefore cut up by their courses, and by the extensive lateral drainage belonging to each, so as to constitute a most varied and interesting country. The creeks and rivers flow through canyons or wide valleys with precipitous sides; and the upland is divided into mesas or plains as the canyons are more or less numerous and widely excavated. Near the southern and eastern border the erosion has been so extensive as to leave ranges of rounded hills to mark the former extent of the high land. This hill and canyon region abounds in fine scenery, and is the most picturesque section of the State, excepting the mountains of the Pecos, and the Guadalupe range.

Climatically considered, Texas embraces two distinct areas. The portion which lies east of the ninety-seventh meridian, including one-third of the State, receives the rains which the southern winds bring as clouds

* See list of elevations in United States, principally west of Mississippi River, by Henry Gannett, U. S. Geol. Survey Terrs., 1877.

from the Gulf of Mexico. The region lying to the west of that meridian receives winds which are generally depleted of their moisture before reaching it. West winds, of course, lose their rain on the Sierra Madre of Mexico; southwest winds come over the arid plains of the plateau, while south winds come direct from no sea, and have generally left their watery freight on the hills and forests of Eastern Mexico. Hence Western Texas is related to the east, as Colorado is to Missouri, but here in the south, these regions are brought into juxtaposition without a wide interval of plains.

Eastern Texas is, up to the eastern boundary of the Lignitic belt, forest covered. In the wet regions are the usual cypress (*Taxodium*) swamps; in the loamy soils the live-oak and hackberry (*Celtis*) forests, and on the sandy uplands the pine; all more or less draped with the *Tillandsia*, when within reach of the daily breezes from the ocean. Between the western boundary of the forests and the first steppe of limestone is a great tract of plains. From the Red River to Houston and west to Austin one great prairie extends, interrupted here and there by patches of post-oak and black-jack (*Quercus obtusiloba* and *Q. nigra*). Southward it is diversified by swamps, with or without *Taxodium*, and alive with flocks of water-fowl. Here also, following the trend of the coast on the one hand and the lines of elevation on the other, the prairie region turns to the westward, extending to San Antonio and beyond. This southern portion of it is much interrupted by live-oak forest and mesquite openings along its northern border. This prairie region differs from the great plains of the North in not being covered by the buffalo-grass, but in supporting longer and coarser species. The region of the *first plateau*, as the hill country west and north of the plains may be definitely called, is not forest covered, nor is it naked. The highlands are diversified with numerous patches of dense shrubbery or brush, with growths of open timber of oak, and with grass. The hill-sides support the same vegetation, often of larger size, while the creek, river, and canyon bottoms are filled with dense forest. The principal trees are the pecan (*Carya olivæformis*), buttonwood (*Platanus occidentalis*), hackberry (*Celtis occidentalis*), pin-oak (*Quercus palustris*), and live-oak (*Quercus virens*); an ash (*Fraxinus*), elm (*Ulmus crassifolia*), wild china (*Sapindus marginatus*), and a spinous barberry with three leaflets. The brush includes many species of much interest to the botanist. Especially is the northern observer struck with the great number of leguminous plants on the lower levels, as mesquite (*Algarobia glandulosa*), the *Acacia famesiana*,

and the *Sophora*, with brilliant vermilion-colored seeds, from which Wood has recently obtained a valuable sedative alkaloid which he calls sophorine. The shrubbery of the highlands consists largely of dwarf live-oaks and two small species, *Quercus sansabæ* and *Q. durandii* of Buckley; with the black persimmon *Diospyrus texana*, a five-leaved barberry, and a *Rhus* very much like the *R. cotinus* of the gardens. Occasionally the elegant madroña raises its kid-colored branches (*Arbutus texana* Buckley), and a small ash with very obtuse leaflets is common. Then there is a multitude of berry-bearing shrubs, and all are intertwined with three or four species of *Ampelopsis* and other creepers. The open stretches are clothed with a dense carpet of buffalo-grass (*Buchloë*), from which rise several species of *Cactaceæ* and two or three *Yuccas* and the *Dasy-lirion*. The lower levels and hill-sides are, however, the home of the cacti. There the large deep-green *Opuntia*, so conspicuous on the arms of Mexico, rears its lines of discs from the short grass, or depends from the cliffs in picturesque festoons; a type among plants of endurance and persistence, of beauty and of repellant hostility.

Having thus glanced at the topography, geology, climate, and vegetation of Texas, I reach the principal object before us, a consideration of the distribution of its vertebrate animals. My remarks will refer chiefly to the *Batrachia* and *Reptilia*, but I commence with what I was able to learn of the distribution of some of the *Mammalia*. In preparing this part of my paper I have made considerable use of Professor Baird's magnificent report on the Vertebrata of the Mexican Boundary.

MAMMALIA.

Uncia onca*; the jaguar. This magnificent cat is not rare on the Nueces River, especially in the extensive thickets along the southern part of its course. Its range extends east as far as the Guadalupe River, where specimens have been killed, and it does not usually range north of San Antonio. I was assured, however, by several persons that a pair were killed a few years ago on the Medina River, in Kerr County, at

* I have employed Dr. Gray's name *Uncia* for the genus of true cats with round pupil, which embraces the largest known species—the lion, tiger, etc. (Proceed. Academy Philada., 1879). In the paper cited I remark, "I assume that this name is derived from *uncus*, a hook, which is appropriate to the weapons of these animals." This proceeding has been the subject of remark by two critics, who with remarkable perspicuity, remind us that Dr. Gray's name is probably a latinization of the common name "ounce." Had I not suspected as much, I would not have used the expression quoted, "I assume." As Gray was in the habit of giving barbarous names, without giving any etymologies, I esteem it a piece of good fortune to nomenclature when any of them can be rendered classic by assumption or any other lawful process.

about latitude 30°. This must be the northern limit of distribution of the species. I saw numerous skins of jaguars killed on the Nueces for sale in San Antonio, and heard of a pair in confinement on the Lagencillas Creek.

Felis pardalis; the ocelot. This southern species is more abundant than the jaguar, and has a wider range. It extends eastward to the Brazos, and north and east of San Antonio, along the hilly front of the first plateau region. I was informed that it is common near Fredericksburg, but northwest, near the forks of the Llano River, it was unknown to the settlers.

Uncia concolor and *Lynx rufus* are common all over Texas.

Vulpes cinereoargentatus and *Canis lupus* are also abundant.

Canis latrans I saw at several points on the central prairies of the State as far north as Austin; but I did not hear of it in the hill-country. After camping in the first plateau region for nearly two months I had not heard its voice, so familiar to the traveller on the northern plains.

Mephitis mephitica. I saw a skull of this South American skunk, procured by G. W. Marnock on the east side of the Rio Grande, and did not hear of its range extending east of the valley of that river.

Mephitis chinga, the common eastern skunk, is found as far west as the Medina River, at least.

Bassaris astuta, Licht. This interesting animal is chiefly found in the rough country of the first plateau region, ranging from the Rio Grande to the headwaters of the Colorado. It delights in the labyrinthine ravines among the brush-covered limestone cliffs, making its nest in the numerous caves and fissures that penetrate them. I heard of it as especially abundant in Bandera and Llano Counties. It is unknown east of the first steppe.

Procyon lotor extends to the Rio Grande, and *Ursus americanus* is found all over Texas.

Cynomys ludovicianus. The prairie-dog was found by the naturalists of the Mexican Boundary Survey in the Limpia Mountains, west of the Pecos. I did not see it near San Antonio, nor between that place and the Llano, but I observed a village on the plain on the north side of that river. Mr. Buckley, State geologist, gives the Rio San Saba as its southern limit, and states that it has reached this point (which is not far north of the Llano) in continuance of a gradual southern extension of range. Dr. Coues, in his monograph of the *Sciuridae*,* enumerates one

* Monographs of the Rodentia of North America, U. S. Geol. Surv. Territories, vol. xi.

specimen as from San Antonio, collected by J. H. Clark of the United States and Mexican Boundary Commission. On reference to the report on the zoölogy of this Survey, specimens are reported as collected en route between San Antonio and El Paso, which leaves the locality indefinitely anywhere in Western Texas north of the former city.

Spermophilus grammurus has a range like that of the *Bassaris astuta*, so far as its eastern limit is concerned. All of the specimens which I saw and of which I heard, were black, the light tips of the hairs giving them a hoary appearance. The coloration is different from that which the species exhibits in other regions, and has given rise to the impression that it indicates another species, for which the name of *S. buckleyi* was proposed. The eminent naturalist, J. A. Allen, of Cambridge, is of the opinion that the Texan animal is only a melanistic variety of the *S. grammurus*. The large bushy tail of this species gives it the appearance of a true squirrel. Its habitat is the rocky cliffs of the first plateau region, where it feeds on the nuts and seeds of the brush. It is always seen climbing on the face of the rocks and never ascends trees. It readily escapes from the hunter by slipping round angles of the precipice or hiding in the numerous fissures and caves where it finds secure retreats. I thus lost all the specimens I saw on the upper waters of the Guadalupe and Llano Rivers.

Dasypus peba; the armadillo. This species I did not see, but I am told by Mr. Marnock, of Helotes, that it extends east as far as the Nueces River, and has been killed near Frio City, in latitude 29° north.

Dicotyles torquatus; the peccary. This is a common animal throughout the first plateau region, and in the lowlands to the south of it as far east as the Colorado. Northward it keeps to the hills and plains of the first plateau, ranging, according to Mr. Boll, an accomplished naturalist of Dallas, as far as the Red River. As in South America, it goes in herds, sometimes large ones, and is particularly common in the chaparral of the Nueces. It is abundant in the hills of the headwaters of the various southward-flowing streams, preferring high ground to the deep ravines. It there hides in brush and thickets, feeding on the acorns of the species of oak, and on the various fruits and roots with which these localities abound. When roused by enemies it does not immediately take to flight, but, when it does so, seeks refuge in the caves of the limestone cliffs. I met a herd in a dry but brushy ravine of the high land near the head of one of the southern tributaries of the Llano. This plain is without water, and crossing its twenty-five miles under a southern sun my thirst became rather urgent. I had no guide

nor trail, and since a failure to strike the narrow sources of the creeks I sought, might involve another twenty miles of waterless prairie, I eagerly directed my way towards the first larger vegetation that suggested springs. The ravine above mentioned contained numerous large hackberry and pecan trees, and a dense undergrowth of shrubs. It had evidently contained several pools in the spring, but now everything was dry. A pair of large owls ruled the darker shades, while the scored condition of the naked and dusty ground indicated terrestrial animals of some strength. I suddenly came on the herd of peccaries. Those not directly in sight fled into the thicket, but there was no retreat in the actions of the half dozen that I met fairly. They stood in a row looking down their noses, which were pointed to the earth, the long black and white mottled bristles of their backs rising and falling. I stood in front quietly watching them, and one by one they trotted off in a leisurely manner, the last to remain being an old boar larger than the rest.

Cariacus leucurus, the white-tailed deer. This is the common deer of Western Texas, and I saw it repeatedly, both wild and captive, and inspected a large collection of its horns in San Antonio. In thirty or forty pairs of horns I found six or eight specimens in which the inferior or first posterior antler was enlarged and more or less extensively forked, as in the *C. macrotis*. It is rarely forked to the same extent as in that species, but I saw two or three specimens which I could not have distinguished from those of the *C. macrotis*. I was assured by the gentleman who shot the deer that they differed in no respect from those which bore the ordinary form of horn.

Cariacus macrotis, the black-tailed deer. This species I did not see, and I was informed by various persons that it did not range south of the Concho River, or the line of the second steppe or plateau.

Antilocapra americana, antelope. This ruminant is found on the plains of the dry region at all elevations, extending its range southward to Fort Inge, and even to Laredo, in latitude 27° 30'. Eastward it is found in the north as far as Fort Worth, but I did not hear of it on the plains east of the first plateau.

Bos americanus, bison. The buffalo herd comes into Northwestern Texas in winter to the eastward of the Staked Plains, on the second and first plateaus. It does not range south of the two-thousand-foot steppe in the west, passing but a short distance below the Concho River.

AVES.

Observations on birds in Texas have been so numerous and so carefully conducted that I devoted little attention to this department. A few species attract the attention of the stranger by their striking character, and I will mention two or three of them.

The scissor-tail, *Milvulus forficatus*, is an important diagnostic species of the Texan zoölogical district. It occurs in all the parts of Texas I visited excepting the eastern or forest regions.

The "Mexican eagle," *Polyborus chiriway*, I only saw near San Antonio. Like the *Uncia onca* it is probably a species of the western portion of the lands below the first limestone steppe.

The chaparral cock (*Geococcyx viaticus*) is another diagnostic bird of much interest. Its habits have often been described, but will bear further mention. It is very abundant in Western Texas throughout the first plateau region as well as in the lowlands, but I did not see it in the wet region east of the ninety-seventh meridian. I found it in the mesquite plain, on the north side of the Llano, in latitude 30° 40'. It appears to be restricted in its range by the occurrence of its food, which consists chiefly of lizards. It is an inquisitive bird and not at all cowardly. It emerges from the brush with its long neck and tail in one line, and then stops and raises both in the air as it gazes curiously around. The head is inclined at various angles, with the feathers ruffled, and the tail slowly rises and falls. If it be alarmed it levels its head and tail again, and with the gait of an excited cock runs straight away from the intruder, without turning to the right or left, for some distance. It evidently relies on its speed, and with good reason, for it is with difficulty overtaken by a good horse. Its bottom is, however, not enduring, and it may soon be run down. In pursuit of lizards it follows them up rocks and tree trunks. It runs up the nearly vertical surfaces with its claws, aided by its wings, and in a most undignified hurry. When it reaches the smaller limbs the lizard's revolutions round the branches become more rapid, and the motions of the bird correspondingly absurd. At such times it looks more like a confused bundle of loose feathers gyrating round the tree—a truly laughable spectacle. It, however, generally gets the lizard, and then may often be seen standing on a naked limb at the summit of the tree with open mouth and dilated breast, considering the further proceedings of its prey, which are now restricted to very close quarters.

REPTILIA.

CROCODILIA.

Alligator mississippiensis. The western limit of the range of this species has never been fixed, and I used my opportunities to acquire information respecting it in Texas. It is common in the waters of the Guadalupe drainage, and is occasionally seen in the San Antonio River within the limits of the city of San Antonio. According to Mr. G. W. Marnock it is found in the Nueces, to its sources, and a skull in his possession belonged to an alligator which was killed between that river and the Rio Grande. In his report on the Herpetology of the United States and Mexican Boundary, Professor Baird records a specimen from Brownsville, on the Rio Grande.

TESTUDINATA.

Testudo berlandieri Agass. I obtained a specimen of this land tortoise, collected by Mr. Marnock in the southwestern part of the State, where, according to that gentleman, it is common. He has also found it near San Antonio. I did not meet with it on the first plateau.

Cistudo ornata Agass. From near Dallas, Boll.

Pseudemys mobilensis Holbr. This species, remarkable for the long tooth-like processes of its alveolar surfaces, is not rare in the drainage area of the Guadalupe River.

Pseudemys elegans Wied. This water-turtle is stated by Agassiz to range over the entire State of Texas. I found it at remote points, *i. e.*, the Upper Trinity River near Fort Worth, and the Helotes Creek, near San Antonio.

Kinosternum henrici Leconte. Found by Mr. Marnock on the tributaries of the Medina, in the region of San Antonio. I did not see it on the plateau.

Kinosternum pennsylvanicum L. A pair of this species was sent me from near Dallas by Mr. Boll. The male was very active and fierce in confinement, and devoured flesh greedily.

Aspidonectes emoryi Agass. Obtained by Mr. Boll, near Dallas, in Northern Texas, and by Mr. Marnock in Helotes Creek, near San Antonio. I repeatedly saw soft-shell tortoises (*Trionychidæ*) in the tributaries of the Brazos and Guadalupe, in the lowlands and first plateau.

LACERTILIA.

Coleonyx variegatus Baird. This very pretty lizard is the only species of the *Gecconidæ* thus far found in Texas. Only two other species of

that family enter the extreme limits of the United States at other points, *i. e.*, Arizona and Florida. I found it rather abundantly in the rocky hills of the first plateau northwest of San Antonio, but did not observe it in that region north of that point either on the Guadalupe or Llano. It is found in holes under stones, towards evening, and generally in pairs, a peculiarity I have not observed in any other lizard. Its manners are also peculiar. It carries its thick tail coiled vertically on one side of its back like the spitz dog. Its movements are quick but feeble, and its short legs forbid the speed of other lizards. *Coleonyx* is one of the few genera of *Geconidae* which have eyelids, and as these are thick, and their movement in winking is slower than in other lizards, the physiognomy is quite peculiar. When handled, this species chirrup and squeals feebly like a singing mouse. One specimen which I took was about to shed its skin, so I placed it in a jar to observe the process. This took place in the night, for next morning it was so clean and its color so bright, that it looked as though gotten up for some special occasion. As no trace of the skin could be found, I suppose that it ate it, after the manner of the *Batrachia*. In life, the colors are very elegant; the pale cross-bands are citron yellow, and the brown ones bright chestnut. The inferior surfaces and all parts of the limbs are flesh or rose color.

Anolis principalis L. This is a species of the low country, and I did not observe it in the hills of the plateau region. Mr. Boll has found it near Dallas, and I took it on the Brazos, in Washington County. Mr. Marnock informs me that it is abundant in the region south of San Antonio.

Crotaphytus collaris Say. I found this species common in the rocks and open woods of the plateau country from near San Antonio to Mason County, north of Llano River, or as far as my observation extended. In the northern part of the State, according to Boll, it first begins to be abundant near Weatherford, longitude 97° 50', and extends westward. This gentleman has never seen it in the cretaceous region of Fort Worth and Dallas. It runs very swiftly, carrying the tail over its back, like *Holbrookia texana* and various other iguanian lizards.

Holbrookia propinqua Baird. Professor Baird has well distinguished the species of *Holbrookia* by the form of the tail, the length of the hind foot, and the coloration. I give short diagnoses of the four species I met with in Texas, adding some characters derived from the scuta.

I. Tail flattened, longer than head and body.

Hind foot one-half length of body; tail with black spots below; male with black crescents on the sides *H. texana*.

II. Tail cylindric, longer than head and body.

Hind foot three-fifths length of body; no spots on under surface of tail; sides with oblique black spots; scales minute*H. propinqua*.

III. Tail cylindric, shorter than head and body.

Hind foot two-fifths length of body; under surface of tail black spotted; no black spots on sides; a few larger supraorbital scales*H. lacerata*.

Hind foot two-fifths length of body; no black spots on tail; two small ones on each side; a few larger supraorbitals.....*H. maculata*.

Hind foot one-half length of body; no lateral or caudal spots; numerous larger supraorbital scales.....*H. elegans*.*

Holbrookia propinqua is easily distinguished from other species of the genus. The tail is slender, cylindric, and longer than the head and body; the hind foot is elongate, being two-fifths the length of the head and body. Ten or more supraorbital scuta; plates of muzzle flat; labials exceedingly narrow, five in number, followed by a flat one. Femoral pores 16-18. A pair of blue spots on the side; none under the tail.

I did not observe the *H. propinqua* in any part of Texas visited by myself. Mr. Marnock finds it abundant near Helotes, and Professor Baird's types came from south of San Antonio. It is doubtless a southwestern species.

Holbrookia maculata, Girard.† I did not observe this species in the parts of Texas I examined, but a variety of it with a longer tail than the usual form was obtained from Mr. Boll, who probably took it near Dallas. Its characters are: Tail slender, cylindric a little longer than body; hind foot less than one-third head and body. Eight or ten supraorbital scuta; scales of muzzle tubercular; labials very narrow, five; femoral pores 13. A pair of blue spots on the side; none under the tail. West of Dallas Messrs. Boll and Isaac obtained this species from Weathford to Fort Concho, and Mr. Isaac sent it from the Wichita country. Professor Baird records it as found between San Antonio and El Paso.

Holbrookia lacerata Cope, sp. nov. Tail cylindric, slender, a little longer than body; hind foot short, less than one-third of head and body; six or eight supraorbital scuta surrounded by minute tubercles; scales of muzzle tubercular. Labials less elongate, 5 oblique, 1 flat; femoral pores 12-13; no blue spots on the sides; transverse blue spots on the inferior side of the tail. Color light brown, with six pairs of transverse dark brown bars between the scapular region and groin, which extend downwards and backwards on the abdomen. Their posterior border is serrate or digitate, and edged with yellowish, producing a

* Bocourt; Mazatlan.

† The *H. approximans*, Bd., is from Northern Mexico, and scarcely differs from *H. maculata* even as a subspecies.

variegated pattern. The inner part of the spots is frequently cut entirely off. The spots are continued on the upper side of the tail, and there are six irregular longitudinal brown bars on the neck. A brown band across supraorbital regions, and spot on upper surface of muzzle. Limbs brown cross-banded. A pale band on inferior part of side, which is crossed by the ends of the lateral spots. Below this are five or six small dark spots, sometimes obsolete. Total length, .099; to collar, .015; to vent, .056. This is a short legged species allied to the *H. maculata*, but with longer tail and very different coloration. As compared with the variety of *H. maculata*, above described, the labial scuta are shorter and less oblique, resembling more nearly those of *H. texana*. In coloration it differs from the *H. maculata* in a point not above mentioned. The dorsal ground color is everywhere the same, a rich yellowish brown. In the *H. maculata* the median dorsal region is paler, and the sides of the back are of a dark shade, which connects the spots as by a wide band.

The most northern locality for the *Holbrookia lacera* with which I am acquainted is in Erath County, west of the Upper Brazos. Mr. Boll found it rather abundantly there and in Comanche County. Southward it has been found by Mr. Marnock on the Guadalupe River in Kendall or Comal County. It thus belongs to the first plateau fauna, and is not widely distributed.

Holbrookia texana Troschel. Tail depressed, wide, and rather short; hind foot short, less than one-third head and body. Seven rather short supralabial scuta; supraorbitals 15-20; scales of muzzle flat. Femoral pores 13. Two blue crescents on the posterior part of each side in male, and transverse black spots on the lower side of the tail in both sexes. The largest species. This lizard is the characteristically abundant form of Western Texas. I found it in the first plateau country to the heads of the Medina and Upper Llano. Mr. Boll states that it does not range east of Fort Worth, in Northern Texas. I did not observe it in the low country of Washington County. It evidently belongs to the plateau fauna. It runs with great rapidity, with its tail generally curved upward, displaying the black spots on the lower side. It prefers rocky ground, and does not ascend trees under ordinary circumstances.

Uta symmetrica Baird. A single pair of this species was seen and taken while running up the logs of a small ranch at one of the heads of the Medina River by Mr. Marnock. It had not been previously found in Texas.

Sceloporus consobrinus B. & G. This lizard is found all over Texas and is very variable in its characters. It always has about 28 transverse, series of keeled unimucronate scales between the interscapula and inter-femoral regions, and the lateral scales are not larger than the ventral. The head scales are smooth. There may be three or two rows of supra-orbitals between the internal and superciliary scales. The colors are often brilliant, especially in specimens from near San Antonio, where the sides of the neck and head are often of a bright rufous, and the tail reddish and yellowish brown at the base. It is very abundant from Dallas west to Fort Concho, and southwest to San Antonio, and in the first plateau region to the head of the Medina River. It is found on the ground, but always takes refuge in trees, running on and around the limbs with great agility.

Sceloporus scalaris Wieg. This small and elegant species is abundant in the region southwest of San Antonio, according to Mr. Marnock, from whom I obtained specimens. I did not see it on the first plateau or eastward.

Sceloporus spinosus Wieg., is abundant in Southwestern and Western Texas, as far north as the heads of the Medina and Guadalupe. I did not see it on the Llano. There are specimens in Mr. Boll's Dallas collections, but this gentleman informs me that it is very rare so far east. It ranges in North Texas chiefly west of Fort Worth. This lizard is especially arboreal, always ascending the trunks of trees when pursued. In this situation its somber colors afford it concealment. These are of different shades of brown without the brilliant blue and other colors of the two species of the genus already named.

Sceloporus poinsettii Bd. and Grd. The largest of its genus found in Texas, this species has nearly the range of the *S. spinosus*. I found it very abundant in the first plateau region as far as the upper waters of the Guadalupe. It differs in its habits from the *S. spinosus*, being exclusively a dweller in rocks. It may be seen at any time running over the limestone cliffs of the plateau region, to which its light colors present but little contrast. The relation between its color and habitat is quite as striking as in the *S. spinosus*.

Phrynosoma cornutum Harl. The "horned toad" of Texas is found throughout the cretaceous region, commencing at Dallas, and extending, via Austin, to San Antonio. It is abundant at and between these points, on the first plateau region, to the neighborhood of Fort Concho. Its range, according to Baird, extends west to the Rio Grande, and south to

Indianola. I agree with Messrs. Henshaw and Yarrow that the *P. planiceps*, Hallow., is not distinct.

Gerrhonotus infernalis Baird. This lizard occurs throughout the first plateau country, from the Rio Grande to the Red River. It has been found on the Helotes Creek by Mr. Marnock, and in Wichita County by Mr. Boll. I did not see it living; it is rather rare, and is said to inhabit rocky places.

Ophiosaurus ventralis Linn. I did not observe this species in Southwestern Texas, but obtained it from near Dallas. The specimens are of the western variety, with only fourteen rows of dorsal scuta, or the subspecies *attenuatus* of Baird. A specimen from the same locality is similar in the characters named, but is remarkable for the strong carination of its superior scales. The carinæ are elevated on the ten median rows, so as to leave sulci between them. On the posterior part of the body the keels extend to the lateral rows, and on the tail even to the inferior surface. There are only ten superior labial scuta, and no postparietals. The infracanthal row extends over the eye, giving three rows between the latter and the frontal plate. I am not sure that these characters are constant, so I note this form under the varietal name of *sulcatus*. It is described from a half-grown animal.

Cnemidophorus sexlineatus Linn. The "swift" is common in Texas. To the northwest I saw it as far as the upper waters of the Guadalupe, and it is common at Fort Concho, and east to Dallas and Fort Worth. It doubtless extends farther in this direction. It is entirely terrestrial in its habits, and moves with greater rapidity than any other lizard.

Eumeces fasciatus Linn. Professor Baird has shown that the *Scincus erythrocephalus*, *quinquelineatus*, and *fasciatus* are forms of the same species; the first name having been given to old males. It is common near Dallas and eastward, but I do not know it from Western Texas.

Eumeces obsoletus Bd., Grd. Mr. Marnock obtained this species near Helotes, where it is rare. I saw, but did not succeed in capturing a lizard, which I suppose to belong to this species, near the head waters of the Medina River. It was of dark tints, with light spots on the sides of the head, like the younger stages described by Professor Baird. It was concealed beneath the bark of a log, and evading for a considerable time my attempts to take it, finally escaped.

Eumeces brevilineatus sp. nov. No postnasal plate; anterior loreal not elevated, reaching interfrontonasal, its posterior border striking the middle of the second labial; second loreal longer than high; two preoculars, between fourth and fifth superior labials. One large pentago-

nal postsymphyseal. Scales in twenty-six longitudinal rows. Hind leg 2.5 times in length of head and body, and meeting the fore limbs when both are appressed on the side.

Color plumbeous above, light olive below. A light band extends along the upper lip to a short distance behind the axilla, and another from the end of the muzzle over the eye to the corresponding point on the side, separated by two longitudinal rows of scales. The total length is m. 170; from muzzle to vent .059; do. from muzzle to ear .012.

This plainly colored scinc is intermediate in characters between the *E. anthracinus* and the *E. tetragrammus* of Professor Baird. It has the single postmental plate of that species, but the prefrontal is not high; there are twenty-six rows of scales, and there are no lateral bands on the body. The superior pair of pale lines are not dark-edged above, and are separated by six rows of scales as in *E. tetragrammus*. It was discovered by G. W. Marnock near Helotes Creek, on the front line of hills, twenty miles northwest of San Antonio, and was afterwards obtained by Mr. Boll from near Fort Concho.

Eumeces pachyurus sp. nov. No postnasal plate; anterior loreal elevated, reaching the transverse interfrontonasal plate. Postloreal as high as or higher than long; two preoculars between fourth and fifth superior labials; one postsymphyseal; twenty-six rows of scales; tail large, nearly as stout as the body at the base, subtetragonal; legs, small, separated by the length of the anterior limb when appressed; the hind leg a little more than one-fourth the length of the head and body.*

* *Eumeces pluvialis* sp. nov., *Eumeces anthracinus* var. Cope, Proceed. Amer. Philos. Soc., 1877, p. 63. This is a *Eumeces* of the group of the *E. anthracinus*. It has therefore five supraorbital plates, and no postnasal. Its loreals are like those of that species and *E. pachyurus*, of a rather elevated form, the prenasal reaching the transverse interfrontonasal. The two preoculars are wedged between the fourth and fifth superior labials, of which the fifth is elongate and beneath the orbit. The scales are in twenty-six rows and the limbs well developed; when laid along the side they overlap, the fore claws reaching the end of the second toe. Postsymphyseal undivided. Color above, blackish olive; below, malachite green. Two narrow green lateral bands separated from each other by a black band two and a half scales wide, the upper ones of opposite sides separated by a width of six scales. There is a faint trace in the typical specimen of a pale vertebral line with a dark border on each side, and there is a black border above the upper lateral line and another below the inferior lateral line. These lines extend to the orbit and ear respectively. The superior labials are green, black bordered; the other head plates brown with black borders.

The elevated form of the loreals and undivided postsymphyseal plate ally this species to the *E. anthracinus*. The more numerous scales and labial plates, the wide interfrontonasal and different coloration distinguish it. From *E. pachyurus* its well-developed limbs separate it. In *E. brevilineatus* the loreal plates are differently formed and the coloration is totally different. The size is rather small. But one specimen of this species is known. It was taken near Mobile, Ala., by Dr. Joseph Corson, U. S. A., well known by his important additions to Eocene vertebrate paleontology.

Above, light brown; below, pale greenish; anteriorly, straw colored; a light narrow band from the superciliary border continued along the body and tail, separated from that of the opposite side by six scales, and with a strong black border above. Below it, a deep brown or black band one and two half scales wide, which is bounded below by another light line; this is in turn bordered by a narrow brown line below, which does not extend like the other bands on the tail. The head and lips are pale brown, and the only head bands are posterior to the orbits. Length of head and body, .078; to ear from muzzle, .013; of fore limb, .015; of hind limb, .019.

This elegant species belongs to the same group as the last, and differs from the *E. anthracinus* and *E. tetragrammus* in the same characters. It differs from the *E. brevilineatus* in the higher loreal plates, the much smaller limbs, and totally in the coloration. One specimen only is in my collection; it was procured near Dallas by Mr. Boll. In size, it is above the average in the genus.

Oligosoma laterale Say. This species is abundant in many different regions of Texas, as at Dallas, Washington, Helotes, San Geronimo Creek, and the Upper Medina.

OPHIDIA.

Stenostoma dulce B. & G. Found not unfrequently by Mr. Marnock under stones near Helotes, Bexar County, also from Erath County from Mr. Boll.

Tantilla gracilis B. & G. Not rare at Helotes.

Tantilla nigriceps Kenn. I procured one specimen, which was taken near San Antonio by Mr. Kallteyer. A second was found by Mr. Boll somewhere between the upper waters of the Brazos and the Colorado Rivers.

Haldea striatula Linn. Two specimens were taken near Dallas by J. Boll, and one by Mr. Schmit, near Houston.

Virginia elegans Kenn. From Dallas and Helotes. The *V. valerie* Bd. and Gird. is the *Carphophis harperti* of Duméril and Bibron, described a short time previously.

Contia episcopa Kenn. This is a characteristic species of Western Texas. It is common west of Fort Worth to Fort Concho and about Helotes in the south. It exhibits a great range of color-variation, so that it is now evident that the *C. isozona* must be reckoned as one of its varieties. Thus its range extends to Utah and Arizona.

The general characters of the species are as follows: Scales in fifteen

rows, all smooth; superior labials, seven; the orbit bounded by the third and more largely by the fourth; loreal, small, quadrangular, longer than high; oculars, 1-2 anterior short, covered above by superciliary; post-oculars resting on fourth labial; fifth and sixth labials equal, as high as long; parietals, large, long; frontal, longer than wide; prefrontals, transverse. Internasals partly separated by rostral, which is not very prominent. Inferior labials six; first pair meeting; fourth largest. Post-geneials extremely short. Temporals little larger than body-scales, 1-2. Muzzle obtuse; head scarcely distinct; eye small. Gastrosteges 163; anal 1-1; urosteges varying in Texan specimens from 35 to 45.

There are three well-marked color varieties, which pass into each other. They are as follows:

Subspecies I, *episcopa*. Ground color ashen to rosy, with the scales broadly tipped with brown. A few only of the median rows of dorsal scales may be red; and the top of the head may or may not be brown.

Subspecies II, *torquata*. Ground color light yellow tinged with brown above; three median dorsal rows orange. Top of head, from anterior border of frontal to near end of occipitals, black. A transverse black spot commencing on the fourth scale behind the occipitals, two scales long and including the fourth row of scales from the gastrosteges on each side. In one specimen the third and fourth rows of scales black at their bases, forming a double lateral stripe, extending from the end of the half collar to beyond the middle of the body. In a second specimen these lines are absent. Lips and below, immaculate. Gastrosteges 183; anal divided; urosteges 38.

I have but two specimens of this variety, of which one is known to be from Northwestern Texas, and the other of uncertain locality, but probably from the same region. In the smaller, the third superior labial is almost excluded from the orbit; in the latter it has the usual share. In the latter also the top of the head is brown, as is often the case in the usual variety.

Subspecies III, *isozona*. There are four specimens of this form in the collection; in two of them the ground color is ashy, in two red. The back is traversed by from nineteen to twenty-one black cross-bands of three and a half scales in length; there are six on the tail. Belly uniform. In two specimens the top of the head is black; in another it is like the general ground color. In the same specimen the dorsal bars are very faint. This is *Contia isozona* Cope (1866), Wheeler Survey, Zoology, Pl. XVIII.

It is evident that these varieties pass into each other completely.

Tropidoclonium lineatum Hallow. Obtained near Dallas by Mr. Boll.

Storeria dekayi Holbr. From Dallas, Houston, and Helotes.

Tropidonotus clarki Baird and Girard. From Dallas and Houston.

Tropidonotus rhombifer Hallow. From Dallas and Helotes. This large species, heretofore only known from the Lower Mississippi, may now be regarded as a resident of the entire low country of Texas. I did not see it in the plateau region.

Tropidonotus sipedon woodhousei B. & G. From Fort Worth west to Fort Mason, and to Helotes. A specimen from the first locality has the abdomen uniform light yellow. In the young the spots are much more distinct than in the adult.

Tropidonotus fasciatus L. From Mr. Boll's collection made near Dallas.

Eutania marciana B. & G. Abundant near Helotes and San Antonio, but not procured by Mr. Boll near Dallas.

Eutania cyrtopsis, subsp. *ocellata*. Scales in nineteen longitudinal rows, the inferior smooth anteriorly but keeled posteriorly. Eight superior labials; loreal higher than long; temporals 1-2-3; the anterior large. The lateral band on the second and third rows of scales cream colored; dorsal band, extending to the end of the tail, orange-red. The usual alternating square black spots between the two bands; the scales in the light interspaces black or deep brown. Anteriorly the lateral black spots unite into a single series of subquadrate spots. The lower borders of the lower series of spots invade the lateral band, sometimes cutting it entirely off into sections of regular length. Below the middle of each section, and therefore alternating with the inferior lateral spots, is another black spot, relating to the arched light bar above it, as pupil to eyebrow. The superior lateral spots in like manner invade the median dorsal band, either cutting it off entirely or giving it a laterally undulatory course. Its width is alternately one and one and a half rows of scales. A dark gray shade connects the lateral inferior spots. Inferior surfaces olive-lead colored; the gastrosteges with blackish bases at the extremities. A large black spot behind the occipital plates, extending to below the angles of the mouth, which is deeply notched behind by the dorsal band. No occipital spots. Labial plates yellow, all equally black-edged. No yellow crescents on the side of the head or neck. Total length, m. .600; length of rictus oris, .020; of tail, .035. This handsome subspecies of the genus was discovered near Helotes,

Tex., by Mr. Gabriel W. Marnock. I did not see it elsewhere, and it does not appear to be common.

Eutania cyrtopsis Kenn. may be defined as *E. sirtalis*, with eight superior labials, a red dorsal band, and the black lateral and nuchal spots very distinct. It belongs to the Sonoran district, and occurs as far south as Guanajuato, accompanying the *E. sirtalis*. The form *ocellata* is characterized by the anterior interruption of the dorsal and lateral bands by the enlarged black spots, producing the color-pattern above described.

Eutania sirtalis L. var. *obscura* Cope. Found by Mr. Boll near Dallas. I did not meet with the species in Western Texas.

Eutania faireyi B. & G. From Dallas, but not seen in Western Texas. The scutellation of the only specimen obtained is very near that of *E. proxima*, viz, 167-1-105.

Eutania proxima Say. The common species of Western Texas, and, like the *E. saurita*, aquatic in its habits. From Helotes and the heads of the Medina and Colorado. Baird and Girard report it from Indianola and the Red River. It does not occur in the Dallas collections. The dorsal band is a lively red in life.

Diadophis punctatus stictogenys Cope. From Helotes; not rare.

Ophibolus getulus sayi Holbrook. A variety of this multiform species was taken near Dallas by Mr. Boll, in which the black ground color is varied by narrow oblique yellowish lines which extend along one and rarely two scales.

Ophibolus getulus getulus L. The form with yellow cross-bands instead of white, from Helotes.

Rhinochilus lecontei Bd. and Gird. From Helotes; G. W. Marnock. The most eastern locality known for this species, which is also found in California.

Phimothyra grahamiæ Bd. & Gird. Another species of the Sonoran fauna found by Mr. Marnock near Helotes, marking its most eastern known range.

Cyclophis æstivus L. Common in Western and probably Eastern Texas.

Coluber emoryi Bd. & Gird. Abundant near Dallas, at Helotes, and west of the Upper Brazos River.

Coluber lindheimeri B. & G. Found near Helotes.

Pityophis sayi mexicanus D. & B. From Helotes; also from near the Wichita River, in Archer County, near the northern boundary. Mr.

Boll states that he saw a specimen nearly twelve feet long from near Fort Belknap.

Bascanium flagelliforme testaceum Say. I obtained specimens from near Dallas, Houston, Brenham, Helotes, and the upper waters of the Guadalupe and the Llano Rivers. Those from Dallas, Brenham, and Houston, which are in the rainy region of Texas, have the greater part of the length a blackish brown. Those from Helotes, the Guadalupe, and the Llano are entirely pale clay-color. This relation of color to moisture is similar to that observed by Dr. J. A. Allen to prevail among the Rodent *Mammalia*. It is not, however, without exceptions, for I saw a specimen taken near Helotes which resembles the dark-colored subspecies of *B. tæniatum ornatum* B. & G.; and the subspecies of the *B. tæniatum*, which I have called *B. piceum*, is found in the dry region of Arizona, near Camp Grant. The form of *B. constrictor*, which is found on the dry plains (*Coryphodon flaviventris* Hallow.), is, on the other hand, of much lighter colors than the variety from the more humid east. I did not meet with this species in Texas.

Elaps fulvius Linn. Abundant near Helotes.

Ancistrodon piscivorus Latr. Abundant at Dallas and Helotes.

Ancistrodon contortrix Linn. Common from Dallas to San Antonio. I caught a specimen on the head waters of the Medina.

Caudisona miliaria Linn. From Dallas, but not obtained in Western Texas. An eastern species.

Crotalus adamanteus atrox B. & G. I observed this species of rattlesnake to be more abundant in the mesquite prairie, near San Antonio, than elsewhere. I obtained it from Helotes and the plateau country in Bandera County. Mr. Boll has not procured it near Dallas, but sends it from Brown County, in the plateau country north of the Colorado.

Crotalus confluentus Say. I have only seen this species from Texas from Haskell County, which is between the head forks of the Brazos. Baird and Girard record it from Bexar County in the south, showing that it has an extensive range in the western part of the State.

BATRACHIA.

Rana halecina berlandieri Bd. Common at Dallas and on the first plateau; also in the low country near Washington on the Brazos. It is the only species of the genus I saw in Texas, but Professor Baird reports *R. catesbyana* from San Antonio.

Engystoma carolinense Fitz. Abundant at Dallas, Houston, San An-

ton, Helotes, and Fort Concho. I heard it in the streets of Houston and San Antonio. In the former city it was abundant in copulá, in the ditches that border some of the streets, in September. The cry is loud for the size of the animal, and is similar to that of the *Bufo americanus*, except in being higher pitched, and more nasal (in the vulgar sense). The animals are extremely shy, and become silent on the approach of human footsteps; and as only the tip of their nose projects above the water-level, they disappear beneath it without leaving a ripple.

Lithodytes latrans Cope, American Naturalist, 1878, p. 186. Size rather large; frontoparietal region flat, its width equal to the vertical diameter of the *membranum tympani*. Skin smooth, that of the abdomen thrown into a disc by a circular fold. Digital dilatations small on all the feet. The toes have no dermal free margins; those of the hand are long, while those of the foot are rather short. The fourth finger is as large as the forearm and exceeds the thumb, which in turn is considerably longer than the second finger. There are two strong palmar tubercles, and the entocuneiform is prominent and obtuse. The muzzle marks a point beyond the middle of the tarsus of the extended hind limb. The tarsus to the entocuneiform is just half as long as the remainder of the foot. There are prominent tubercles on the inferior side of the digits of both extremities. The head is wide and flat, and the loreal region oblique. The nasal region is flat and gently decurved, and the lip projects a little beyond the muzzle. The long diameter of the eye equals the length from its border to the external nostril, which is very near the end of the muzzle, and exceeds the long or vertical diameter of the *membranum tympani* by one-half of the latter. The width of the tympanic membrane is five-sixths of its height. The tongue is subround. The *ostia pharyngea* are large, but smaller than the choanæ. The vomerine teeth are in two short, nearly transverse patches, on elevated bases, their apices nearly in line with the posterior border of the choanæ. In younger individuals the choanæ are obliquely longitudinal.

Length of head and body, m. .076; length of head to line of posterior borders of tympanum, axially .024; width at latter point, .031; length of posterior leg, .107.

Color of superior surfaces brownish gray marked with a few large brown spots with pale centers. The largest of these is on each scapular region; a smaller pair is one over the extremity of each sacral transverse process. There are several on the coccygeal region, and above the groin; one on each eyelid, and one or two on the middle of the nasal

region. Another covers the tympanum, and a brown band connects the orbits around the end of the muzzle. There are two large brown spots on the lip, one below the eye, and one in front of it. The segments of the limbs have broad cross-bands, excepting the humerus. Below pale, immaculate.

This species is one of the larger forms of the genus. The nasal bones are in contact for most of their length, but diverge a little posteriorly, displaying a small portion of the ethmoid. This is not typical in *Lithodytes*, but approaches the state of things in *Epirhexis*. It is the second species of the genus found within the limits of the United States, the other being the *L. ricordi*, a Cuban form, found in Southern Florida.

This frog inhabits the cliffs of the cretaceous limestone which are found in every direction along the borders and river valleys of the first plateau region. My friend G. W. Marnock, who discovered it, informs me that after rains it is very noisy, making the rocks resound with its cry, which is somewhat like a dog's bark. It hides in fissures, and is so difficult to find, as to be generally unknown to the country people, who suppose that the voice proceeds from a lizard. According to Mr. Marnock the eggs are hatched in winter, and the tadpoles pass their existence in temporary pools of rain-water which collects in holes in the rocks and at a distance from the creeks.

Syrrophus marnockii Cope, American Naturalist, 1878, p. 253.

CHAR. GEN.—Family *Cystignathidæ*, group *Hylodinae*. Xiphisternum a cartilaginous plate, notched; digits free; vomerine teeth none; ear well developed; nasal bones in contact, forming a solid roof over the ethmoid cartilage. Pupil horizontal.

This genus is simply *Phyllobates* with the nasal bones of *Hylodes*. In the former genus the nasals and ethmoid have the structure seen in *Elosia*. It is probable that *Phyllobates cystignathoides* m. from Vera Cruz belongs to this genus, as small and probably immature specimens have large and closely approximated nasal bones. A third species, *S. leprus* Cope, has been found at Tehuantepec by Sumichrast.

CHAR. SPECIF.—The typical specimen is as large as *Hyla versicolor*, but has a large flat head and remarkably short hind legs. The muzzle is flat and slightly depressed above, and projects a little beyond the edge of the lip. The nostril is a little behind the apex and as far in front of the orbit as the long diameter of the latter. Tympanic membrane round, its diameter about half that of eye. Choanæ lateral, equal in size to the *ostia pharyngea*. Tongue longer than wide, full, entire. Integuments

everywhere smooth; on the abdomen a faint discoidal fold. Digits short, moderately expanded and truncate at the extremity. Prominent tubercles at the proximal ends of the phalanges below. First and second anterior toes equal and shorter than fourth. The heel of the appressed hind limb reaches the middle of the tympanum, and the extremity of the tarsus a little anterior to the orbit. The fore limb is relatively longer, the wrist extending beyond the extremity of the muzzle. The tarsus is two-fifths the entire length of the posterior foot. The interorbital space is flat and wide, and is but a trifle narrower than the expanse of the sacral diapophyses.

The color of the upper surfaces is a light purplish brown, closely spotted with rather small closely placed and broadly defined, dark brown spots. The spots are less distinct on the head. Inferior surfaces light yellowish, immaculate, this tint commencing as small spots on the pale ground of the sides. Limbs above brown, broadly cross-banded with yellowish; femora behind, light brown with a few light points.

This frog was found by Mr. G. W. Marnock near Helotes, Bexar County, Texas, and I dedicate it to him with much pleasure.

Measurements.

	M.
Total length.....	.032
Length to line of posterior edge of tympanum.....	.012
Width of head at same point.....	.015
Length of hind leg.....	.043
Length of hind foot.....	.018
Interorbital width.....	.005

Chorophilus ocularis Daudin, Cope. This species resembles the eastern *C. ocularis*, but some specimens differ in the tuberculate character of the skin of the superior surfaces, and in the rudimental web of the hind foot. The head is rather short, and the anterior outline is a narrow oval. The extremity of the muzzle projects beyond the mouth, and the lores are slightly oblique and a little concave. The nostril is but little nearer the extremity of the muzzle than the orbit. The vertical diameter of the tympanum a little exceeds the transverse, which is one-half the long diameter of the eye-slit. The pupil, as in the other species of this genus, is horizontal. The tongue is wide, discoid, and entire behind. The *ostia pharyngea* are smaller than the small choanæ. The vomerine patches are short and transverse; they are entirely within the lines of the inner borders of the choanæ and behind the line of the posterior borders of the same.

The tubercles of the superior surfaces are small and rather closely placed; they are largest on sides of the back. There is a faint areolation of the gular region. The limbs are short and stout. The humerus is half or more inclosed in the skin. The palm reaches nearly to the end of the muzzle. The fingers are short and stout, and have neither dilatations nor borders. The first is shorter than the second, which equals the fourth. The palmar tubercles are not distinct. The heel of the appressed hind foot in thin specimens marks the middle of the tympanic disc or posterior border of orbit, and the end of the muzzle the extremity of the tarsus. The hind foot beyond the tarsus is only as long as the tibia. The toes have no dilatations, but possess dermal margins, and a short but distinct basal web. There is but one solar tubercle, a small cuneiform prominence. Total length, m. .035; of head, to line of posterior borders of *membranam tympani*, .011; width of head at the latter, .014; length of hind leg, .045; of femur, .013; of hind foot, .022; of tarsus, .009.

The color above is olive-gray, and below, uniform straw-color. A black band passes from the end of the muzzle on each side, through the eye, and expanding over the ear-drum, terminates in front of the humerus. One or two dark spots above and behind the axilla may unite to form part of a lateral band. There may or may not be blackish spots above the groin and on the coccygeal region and anterior part of the back. The limbs have a few dark-brown cross-bands; the femur is yellowish and unspotted behind.

There is some difference between the Texan specimens and those from Georgia. Specimens from the latter State are very smooth, and the limbs, especially the feet, are slender. The heel reaches to the orbit, or at least to the front of the tympanic membrane, and the end of the tarsus extends to or well beyond the end of the muzzle. The web and digital dermal borders are much less marked. Two specimens were obtained by Mr. Boll near Dallas, and three at Helotes by Mr. Marnock. All the latter have large brown dorsal spots.

Chorophilus triseriatus clarki Bd. From Dallas, Fort Concho, and Helotes.

Acris gryllus crepitans Bd. Common at Dallas, Washington, Helotes, and on the first plateau. Professor Baird adds Indianola, giving this small species a range over all parts of Texas.

Hyla carolinensis semifasciata Hallowell. From Dallas, and very common near Helotes. From Indianola, according to Professor Baird.

Hyla femoralis Daudin. A specimen larger than the largest individuals I have previously seen; differs also in the greater extent of palmaria of the fingers, and in the coloration of the concealed surface of the femur. In eastern specimens the posterior face of the femur is brown, with rather small yellow spots; in this form it is yellow, with a blackish, coarse reticulation, which only extends to the lower surface on the proximal half of the thigh. The sides have a double row of small black spots, which inclose a yellow band. This is probably a subspecies, and may be distinguished by the name of *chrysozelis*. One specimen as large as a large *Hyla versicolor* was taken by Mr. Boll near Dallas.

Smilisca baudini Dum., Bibr. This Mexican species has been found by Mr. Marnock in the low country southwest of San Antonio, commencing with the San Miguel Creek, a tributary of the Medina. This is its most eastern known range, that previously given by Professor Baird being Brownsville (as *Hyla vanvlietii*).

Scaphiopus varius Cope. Not rare in the low country from Atascosa County southwestward, according to Mr. Marnock, to whom I am indebted for specimens. This species is a true *Scaphiopus*.

Bufo debilis Girard. Specimens from Mr. Marnock from west of the Nueces River. Specimens in my collection are stated by that gentleman to have been taken near Fort Concho, and Mr. Isaac sends it from as far east as the Wichita River, thus greatly extending its range. It was originally brought from the valley of Mexico, and the Smithsonian Institution subsequently received it from Mazatlan. Baird reports it from the Lower Rio Grande. It is probably diagnostic of the Sonoran region.

Bufo punctatus Bd., Gird. Found near Helotes by Mr. Marnock, but not known from further east. Boll found it as far north as Fort Concho. Baird gives it from Western Texas, and I have determined it from Cape Saint Lucas, Lower California. It is found as far south as Guanajuato, from which place I have received it from Dr. Dugés. It is another Sonoran type.

Bufo lentiginosus americanus Lec. From Dallas; Mr. Boll. This form also occurs at New Orleans. The usual form of the Gulf States, the typical *lentiginosus*, has not yet been found in Texas.

Bufo valliceps Wieg. A Mexican toad found all over Southern Texas. I have it from Washington and Helotes. Professor Baird reports it from the Texan coast of the Gulf. Some specimens were sent to me by Professor King, of Baton Rouge, La., which he believed to have been taken in the neighborhood of that city.

Diemyctylus miniatus Raf., subsp. *meridionalis* Cope. This new name is introduced for a form of this genus which has definite characters and a special geographical range. It has the longer digits and low cranial crests of the *D. miniatus*, and agrees in color with the variety *viridescens*. From both forms it differs in the absence of red spots from the dorsal region, which is instead covered with rather large black spots, which continue on the tail. The ground above is olive; below it is yellow, which is marked with numerous small black spots. A character which appears to be of importance is seen in the fore foot of the only specimen in my possession. The outer toe is more than half as long as the penultimate, while in the varieties *viridescens* and *miniatus* it is less than half as long.

The first specimen of this form which I met with was sent to the Smithsonian Institution from Matamoras, Mexico. G. W. Marnock finds it in the tributaries of the Medina River and southward, and it has not been found east of that region. I did not see it in the plateau region.

I may mention here that the presence of the temporal pits cannot be used as a definition of the genus *Diemyctylus*, since they are as often wanting as present.

Plethodon glutinosus Green. From the first plateau as far south as Helotes.

Amblystoma microstomum Cope. Abundant near Dallas; also from Houston.

Amblystoma opacum Grav. From Wichita County, near the Red River; Jacob Boll.

PISCES.

PERCOMORPHI.

Boleosoma phlox sp. nov. This species has the physiognomy of a *Pœcilichthys*, but the technical characters of *Boleosoma*. The mouth is terminal, and the superior arcade extensively projectile. The soft dorsal is considerably longer on its base than the anal, and the cheeks and opercles are smooth. The lateral line is straight, and does not extend beyond the point below the middle of the second dorsal fin. The second dorsal is elongate and the spines are rather long. Fin radii: D. X-12; A. II-5; V. I-5. The anal spines are well developed, and the first is stouter and a little longer than the second. The dorsal fins are separated by the width of a scale. Scales 5-52-8, present on the belly, rudimental or wanting on the nape and breast. The mucous tubules are strong, extending from the lateral line above the operculum and orbit to

the front of the nares, and sending a branch part way to the middle line of the occiput. The head is compressed and the front gradually descending. The mouth is nearly horizontal, the end of the maxillary bone marking nearly the anterior border of the pupil of the eye. The orbit is large, entering the length of the head four times, and exceeding a little the space between it and the end of the muzzle. The interorbital space is very narrow, and the opercular spine is strong. The head enters the length with the caudal fin 4.75 times, and, including the opercular spine, is as long as the base of the spinous dorsal. The latter is, in turn, shorter than the base of the soft dorsal. The length of the caudal fin is intermediate between the two.

The color of the body is vermilion, with rather indistinct small brown dorsal spots. Opposite to these there is a series of similar blue spots on the lateral line, of which those posterior to the anal fin are continued to the inferior surface. The spinous dorsal has a dark-blue border, and a red shade from the base upwards, which is present in the second dorsal also. This fin, unlike the caudal, is not cross-barred. Inferior and lateral fins immaculate. Ventral and pectoral fins light blue. There is a dark shade on the operculum, and an indistinct one below the eye. Length, with caudal fin, m. .043; interorbital width, m. .0005.

I took this species in the Trinity River, near Fort Worth.

Percina caprodes carbonaria Girard. From near Dallas (Trinity River) and the Llano, Kimble County.

Micropterus floridanus Les., Goode; *Cichla floridana* Les., 1822; *Huro nigricans* Cuv., Val., 1828; *Micropterus nigricans* Cope. Numerous specimens, probably referable to this species, were taken in the Trinity, Llano, Guadalupe, and Medina Rivers. Several of them, however, differ materially from Professor Gill's description* in his comparative diagnoses of this species and the *M. salmoides*. I select, in illustration, an adult specimen which I caught in the Johnson's Fork of the Llano River, in Kimble County. It agrees with the description cited in the following points: First, the number of scales $7\frac{1}{2}$ or 8, 63; second, those of nape equal; sixth, scales at base of second dorsal forming a low sheath; eighth, mouth large; ninth, maxillary bone extending to line of posterior edge of orbit; tenth, soft dorsal rays I-11, anals III-10.

The characters in which the specimen differs from Professor Gill's description are the following: Third, scales of cheeks minute, seventeen in an oblique and nine in a horizontal series; fourth, scales of

* Proceed. Amer. Ass. Adv. Sci., 1873, pp. 56-71.

interoperculum covering only half that bone; fifth, scales of preopercular limb none; seventh, scales ascending high between rays of anal fin; eleventh, spinous dorsal depressed, the ninth spine half as long as the longest, and two-thirds as long as the tenth. These points of difference are those given by Professor Gill as characters of the *M. salmoides*, excepting the last. The form of the spinous dorsal fin is nearly that of the *M. floridanus*, but the proportions of the spines are those assigned by Gill to the *M. salmoides*.

The differences in the size of the cheek scales, with the characters of the nakedness of the preopercle, and half nakedness of the interopercle, would indicate a valid third species of the genus, were the characters assigned by Professor Gill permanent in the species to which he assigns them. Such supposed species would not be the *Dioplites nuccensis* of Girard, because this author expressly states that the scales of the cheeks and opercula are of equal size. I have, however, examined some *M. floridanus*, from Florida, in my collection, and find these also to differ from parts of Professor Gill's description. I find the cheek scales large, as stated by Gill, and different from the Texan specimens, but the interopercle is only half covered by its scales. The spinous dorsal presents almost exactly the characters of the Texan specimen, and the soft dorsal has the rays I-13, the number assigned by Gill to the *M. salmoides*. The second dorsal and anal fins are naked, as Gill describes.

It appears, then, that the only important character which distinguishes the Texan form from the Floridan is the much smaller size of the cheek scales. I do not know how constant this character will prove. Perhaps some of the names recently given to Mexican forms may be applicable to a variety so defined.

The Llano fish is rather light colored, and there is a dusky line along the middle of each row of scales, which are especially distinct below the lateral line.

I may add here that it seems that the name and characters of the genus *Micropterus* were based on a monstrous or mutilated specimen. The characters thus derived were false and absurd. Under ordinary circumstances this name should be relegated to the limbo of undeterminable myths. The next name in order is *Calliurus* Raf., which is only applicable to young fishes of this genus, and was almost as badly characterized as *Micropterus*. This name should, however, be adopted, as its characters were drawn from normal objects. As, however, *Micropterus* has obtained some currency, and as the name *Calliurus* is peculiar in significance, I retain the former provisionally.

Apomotis cyanellus Raf.; *Calliurus formosus* Girard; *Bryttus mincopas* Cope. From Dallas and Fort Worth, from the Trinity River. I have also noted this species from Minnesota to Virginia, in the Mississippi Valley.

Apomotis sp. This species agrees nearly with Girard's description of *Bryttus humilis* Girard, but Professor Jordan informs me that it is not that fish. The form is rather elongate and compressed, and the head is elongate-conic, with a large eye, one-fourth its length. The palatine teeth are present, and the maxillary bone extends to the line of the anterior margin of the pupil. Radii: D. X-10; A. III-8. The ventral fins originate a little in advance of the line of the first dorsal. Every scale has a yellow centre, and the larger specimens are dusted over with black dots. From the Llano River.

Lepomis speciosus Gird. (?); *Pomotis* Gird. This is my *Lepomis longispinis*, a species which ranges north as far as Nebraska and Indiana. Girard's description applies well to it, but his figure (U. S. Mex. Bound. Surv., pl. iv, figs. 5-8) represents it very badly, so much so as to lead me to question the applicability of Girard's name. Numerous specimens from the Llano River. Radial formula: D. X-11; A. III-11. Scales 7-40-14.

Lepomis anagallinus Cope var. I took a sunfish in the Trinity River at Fort Worth which apparently forms a geographical race of this species. The only peculiarities which I observe are the absence of a soft ray from the dorsal fin, and addition of one to the anal, and the shade of the color. The spots and shades which are red in the northern form are yellow here; this color is especially to be noted in the anal and ventral fins. There are no black spots on the dorsal fins. Radii: D. IX-10; A. III-9. Scales 5-36-11. In three specimens out of seven there are only nine dorsal spines.

Xenotis megalotis Raf.; *Lepomis* Cope (Journal Academy Nat. Sci. Phila., 1866, 220); *Pomotis nitidus* Kirtland. The most abundant freshwater fish in Texas, including two varieties; the one possessing a black spot on the second dorsal, the other lacking it. I have the former from the Trinity at Fort Worth, the Helotes Creek, and the Upper Medina; and the unspotted form from the Trinity at Dallas and Fort Worth, and Johnson's Fork of the Llano, in Kimble County.

HAPLOMI.

Fundulus diaphanus Les. Abundant with *Campostoma* in a pool in, the otherwise dry bed of Comanche Creek, Mason County.

Zygonectes notatus Raf.; *Fundulus olivaceus* Stor. The Trinity River, at Fort Worth.

Zygonectes brachypterus sp. nov. Base of first dorsal ray behind the vertical line equally dividing the base of the anal; radii, few, D. 7, A. 8; ventrals not reaching base of anal. Scales large, in nine longitudinal and thirty transverse rows. Head wide, with overhanging supercilia; interorbital width twice the diameter of the orbit, which enters the length of the head 2.5 times. Head entering length, with caudal fin, 5.5 times, and equalling the length of the caudal fin. Color uniform olivaceous; the scales with brown edges; cheeks silvery; no spots on the head. Length m. .049. This plain species, distinguished by the small number of its fin rays and its robust form, was taken in the Trinity River at Fort Worth.

NEMATOGNATHI.

Ichthæolurus cœrulescens Rafinesque, Gill, Cope. From the Trinity at Fort Worth and Dallas and the Little Wichita. The name first adopted by Gill from Rafinesque, and frequently used by later writers, is very appropriate to this fish, and should not, it seems to me, give way to the *Silurus punctatus* Raf., a very inappropriate name, unless it be absolutely necessary. In view of the frequent uncertainty of the identification of Rafinesque's names, I have in this instance followed the next succeeding author who has used such name, and believe that it will be to the advantage of the subject to allow such use to remain as authoritative in all cases. The reopening of the subject in doubtful cases is, from all points of view, unprofitable.

Amiurus lupus Girard. A compressed and rather slender species, with the caudal fin emarginate for about one-fifth of its length. Head short, moderately elevated behind, about one-fourth the length less the caudal fin. Eye entering length of head 5.5 times, and interorbital width 4 times, over convexity. Depth at front of anal fin a little less than length of head. Radii: D. I-6; A. 22; P. I-9-10. The spines are rather long and irregularly grooved. Those of both dorsal and pectoral fins have a remote serration on their anterior faces; and while the pectoral exhibits low teeth on its posterior face, that part of the dorsal spine is smooth. The postclavicular process is acute and grooved. The maxillary barbels extend to the middle of the pectoral spines, and the nasal barbel reaches to above the middle of the preopercular border. The median mental barbels extend to the bases of the branchiostegal rays, and the external ones to beyond their extremi-

ties. Mouth terminal. Color lead-color, darker on the head; below silvery. Length m. .100.

This species of catfish was obtained by Mr. Marnock from one of the tributaries of the river Medina. He states that during the dry season it buries itself in the mud in the bottoms of the creek channels, and may be found there by digging. I find no peculiarity of the branchial apparatus or swim-bladder indicative of such a habit.

Amiurus brachyacanthus sp. nov. This is a robust species of rather small size, which is distinguished, among other characters, by the shortness of the spinous radii. Radial formula: D. 1-6; A. 22; P. 1-6. The body is rather deep; depth at front of anal fin 4.4 times in the length exclusive of the caudal fin; the head enters the same 3.6 times. The (external) eyes quite small, entering the length of the head seven times, and the interorbital width four times. The head is not depressed, and rises gradually posteriorly. The maxillary barbels extend to the middle of the pectoral spine, and the nasals to above the middle of the operculum. Both pairs of mentals extend beyond the extremities of the branchiostegal rays behind them. The dorsal and pectoral spines are small and acute and are not concealed in the skin, but have a rough surface. The former is not serrate before or behind, and the latter is weakly serrate behind only. The lengths of both are nearly equal, and are less than one-third the length from the end of the muzzle to the base of the dorsal spine, and 1^{mm} less than the interorbital width. The lips are equal. Caudal fin.?? The adipose fin extends anteriorly along the back to above the middle of the pectorals (?). The color above is blackish, and below yellowish. Length, with caudal fin, m. .080.

I took two specimens of this species in Wallace Creek, one of the heads of the Medina, in Bandera County.

Amiurus catus Linn.; Jordan Siluridæ, p. 90. Little Wichita River; J. Boll.

Amiurus bolli sp. nov. Represented by two specimens in my collection. They are nearest to the *A. natalis* Les., but differ in several features from all of the numerous varieties of that species recorded by Jordan. They differ very much from the typical *A. natalis cupreus*, and appear to come nearest the *A. n. analis* Jordan. They agree with *A. natalis* in having a rounded caudal fin, and twenty-five anal radii, and subequal jaws. The body is more slender than in any of the varieties, its depth entering the length minus the caudal fin, 5 and 5½ times. In *A. natalis* these proportions are as 1 to 4 and 4½. The form of the caudal fin

differs from that of most other species in having the superior distal angle somewhat produced, while the corresponding lower angle is obliquely truncate. The intermediate border is scarcely emarginate when spread out. Other characters are as follows: Head flat, one-fifth longer than wide; greatest gape of mouth equal half length of head from dorsal spine, omitting soft upper lip. Length of head $3\frac{2}{3}$ times in total, minus caudal fin; length of base of anal fin the same. Pectoral spine finely serrate posteriorly, more than half as long as head; dorsal spine long, smooth, a little shorter than pectoral, its base a little nearer end of muzzle than origin of adipose fin. It is separated by a wide space from the supra-occipital crest. Longest anal rays one-half as long as head. Branchiostegal rays 9.

Color light or dark olivaceous above; below, with mental barbels, yellow or white in spirits. Length of specimens 6 inches.

The only species besides the *A. natalis* with which to compare this species is the *A. erebennus* Jordan. From this species it differs in many points.

Little Wichita River, Northern Texas. It is dedicated to the well-known naturalist Jacob Boll, who discovered it.

Pelodichthys olivaris Raf. The Trinity, at Fort Worth and Dallas.

PLECTOSPONDYLLI.

Myxostoma macrolepidotum Les. This Texan representative of the "red horse," var. *duquesnei*, was found to be common in the Guadalupe and Llano Rivers. It may prove to be but a geographical race or subspecies, as I find no other difference between the two than a rather larger number of scales in the Texan form. They number 6-45-5 in the latter; in var. *duquesnei* 5-42-4, a slight difference, but more important in this genus than in many others. Radii: D. I-12; V. 9.

Campostoma anomalum Raf., subspecies or var. *pullum* Ag. I found the small form of this species common at Helotes, on the Upper Medina, and in Comanche Creek, at Mason.

Hybognathus flavipinnis sp. nov. This species belongs to the second division of the genus, as defined in my Fresh Water Fishes of North Carolina (Proceed. Amer. Philos. Soc., 1870, p. 466) by the narrow sub-orbital bones and the inconspicuous speculum of the postfrontal region, the type of which is the *H. argyritis*. The present fish differs from that one in the smaller scales and quite distinct coloration. Formulæ:

D. I-8; A. I-7-8; scales, 7-41-2-4. Eye large, horizontally oval, its length 2.66 times in that of the head, and equal to interorbital width. The muzzle is shortly decurved to the mouth, which is terminal and short. The extremity of the maxillary bone extends half way from the end of the muzzle to the line of the orbit. The length of the head is contained in the total (with caudal fin) five and three-sevenths times, and is 1^{mm} less than the depth of the body at the ventral fin. The origin of the latter is below or a little in advance of the base of the first dorsal ray. The pectoral is short, not nearly reaching the ventral, which in turn falls far short of the vent. The lateral line rises anteriorly. The occipital region is convex and rather wide; the interorbital region nearly flat. Dorsal region dusky; a wide dusky lateral band, separated by a pale band from the dorsal shading. An inconspicuous black dot at the base of the caudal fin. The fins generally pale yellow, and without spots. The bands and shades of the body are continued on the head. Length m. .076.

This fish differs from the *H. siderius** Cope, in its much larger scales. I found it to be abundant in the Johnson's Fork of the Llano, in Kimble County.

Hybognathus nigrotæniata sp. nov. This species nearly resembles the last, but differs in its considerably larger scales, relatively rather shorter body, and longer fins. The formulæ are: D. I-8; A. I-8; scales 5-34-3, or fewer than in the *H. argyritis*. The head is one-fifth the length, including the caudal fin, and about equal to the depth at the ventral fin. The latter originates a little in advance of the line of the first dorsal ray. The diameter of the eye is large, a little less than one-third the length of the head, and a little less than the interorbital width. The ventral fin nearly reaches the vent.

In color and other respects the description of the *H. flavipinnis* is applicable to the present species. I may modify this by the observation that the lateral band is blacker in the present species, and there is no evidence that the fins were yellow. The size is less. Length of the largest specimen m. .066.

This cyprinoid is abundant in the upper waters of Wallace Creek, one of the heads of the Medina.

Cochlognathus biguttata sp. nov. The genus *Cochlognathus* of Baird and Girard was stated by Girard to be related to *Pimephales*, and to have

* This species is a *Hybognathus*. Through some unaccountable oversight it was referred to *Hyborhynchus* in Vol. V, Report Lieutenant Wheeler, p. 670.

the same character of dorsal fin. In the "*Cyprinidae* of Pennsylvania" I showed that it was much more like *Alburnops* ("Hybopsis") in all respects; that it is of carnivorous habits, with short alimentary canal, and with the short dorsal spine not separated by membrane from the first cartilaginous ray.

The present is the second known species of the genus. It is a fish of rather uniform diameter and deep caudal peduncle. The head is oblong and rather wide above; the muzzle has a decurved profile and terminal mouth. Radial formula: D. I-8; A. I-7. Scales 7-34; number below the lateral line unknown, as they are quite carneous. The orbit is large, entering the length of the head 3.4 times and a little more than once in the length of the muzzle, which is just equal to the interorbital width. The head is wide behind and flat above. The infraorbital bones are narrow, while the preorbital is large, with convex inferior and concave superior border. The extremity of the maxillary bone does not quite reach the line of the anterior border of the orbit.

The ventral fin commences opposite the second or third dorsal ray, and reaches the vent, but not the anal fin; the latter is small in all dimensions. The pectoral fin covers three-fifths the space between its base and that of the ventral. The length of the head is about one-fifth the total, including caudal fin, and is a little greater than the greatest depth of the body.

The color is silvery, without dark markings on the head or body. There is a black spot on the middle of several anterior dorsal rays, and a small but very black one at the origin of the caudal fin on the bases of the rays. Total length m. .063.

As compared with *C. ornatus*, according to Baird and Girard's description and figure, in the United States and Mexican Boundary Survey, the present fish presents various differences. In that species the ventral fins originate below the first dorsal spine, and there are but six anal rays, etc. Its color is also quite distinct, resembling more that of *Pimephales* in the general suffusion of dark color over the dorsal and caudal fins and the absence of the characteristic black spot at the base of the latter.

Abundant in the Trinity River at Fort Worth.

Cyprinella venusta Girard. (United States and Mexican Boundary Survey, II, p. 54 pl. xxxi; figs. 1-4.) I made the above identification provisionally, and Professor Jordan informs me that it is correct. Since Girard omits most of the important characters of this fish in his short description, I give the following diagnosis for future use: Orbit large, contained 3.5 times in length of head and 1.4 times in interorbital

width. Length of head contained 4.12 times in length without caudal fin. Muzzle rather acuminate; maxillary bone not reaching orbit. Radii: D. I-8; A. I-8. Scales 7-37-3. Silvery, without markings, excepting a large black spot at base of caudal fin nearly as large as the orbit. Teeth 1.4-4.1 or 4-4, crenate. My largest specimens exceed those of Girard in proportions, measuring m. .084 in total length.

This species is near the *C. cercostigma* Cope, differing mainly in its larger eye and deficiency in the number of the small teeth of the external row. According to Jordan, the *Cyprinella texana* Gird. is this fish. Abundant in Johnson's Fork of the Llano River.

Moniana jugalis Cope (variety or different species?). The Texan form which I mention under this name agrees nearly with that to which I first applied it, but I find that numerous specimens agree in possessing a smaller number of longitudinal series of scales above the lateral line, and sometimes one less below it. The number is $\frac{a}{2-3}$; in *M. jugalis* from the Missouri $\frac{7}{7}$. Abundant in the Trinity at Fort Worth and Dallas.

Moniana sp. A much more slender species than the last, represented by very small specimens.

SUPPLEMENTARY NOTES.

Conepatus mapurito Gm. Mr. Boll sends me this skunk from the Wichita region, near the Red River.

Eumeces pachyurus Cope. I find on comparison of this species with specimens of *E. septentrionalis* Bd. from Neosho Falls, Kansas, in the Smithsonian Museum, that the differences between the two species are not great, but that they are nevertheless sufficiently distinguished by the following characters:

<i>E. pachyurus.</i>	<i>E. septentrionalis.</i>
Postnasal scute reaching interfrontonasal.	Postnasal widely separated from interfrontonasal.
No dark dorsal stripes.	Two black dorsal stripes.
Rows of scales, 26.	Rows of scales, 28.

Two specimens in the Smithsonian Museum (No. 5325) from Savannah, Ga., appear to represent a form of *E. septentrionalis*, differing only in the relatively longer legs. They are, when extended on the side, only separated by a space equal to the length of the forefoot. In the typical form the space is equal to the length of the forearm and forefoot together.

Some exceptional forms of *Eumeces obsoletus* have been sent me from Douglas County, Kansas, by Prof. F. H. Snow, of Lawrence. It is

represented by three large adult individuals of very light colors. They differ remarkably in the scuta of the nose. In one the frontonasals and supranasals are in contact; in the other two they are separated by the prefrenals. In the former there is one prefrenal on both sides, and a postnasal on one side. In No. 2 there is a postnasal on each side, and two prefrenals, one above the other, on one side only. In No. 3 there is no postnasal plate; the prefrenal is in contact above with the interfrontonasal. On one side of the head it is divided by a horizontal fissure into two scuta, one above the other; the other side is undivided. The hinder leg measures one-third the distance from its base to the end of the muzzle. When extended along the side, the fore and hinder limbs just touch the extremities of each other's claws. The second and fifth posterior toes are of equal length. Color pale ashen, with a bluish or greenish tinge. The external edges of the scales of the second row from the median line are brown, forming a longitudinal line on each side. In the same way the edges of the scales of the oblique lateral rows of scales are brown. These oblique brown lines are each six or seven scales long; anteriorly they become more longitudinal, two parallel lines running backwards from above the superior border of the ear. Superior labial plates brown edged. Scales of posterior faces of limbs brown edged. Length to vent, m. .101; length to axilla, .038; length to meatus of ear, .020; length of hind leg, .032.

No. 1 is colored like No. 3, omitting the dorsal lines; No. 2 is like No. 1, except that the lateral brown borders unite into a wide, loose band.

Eumeces epipleurotus sp. nov. Through the kindness of Professor Baird I was able to inspect three specimens of this species which are preserved in the Museum of the Smithsonian Institution. They are from the northern boundary of Texas and from Nebraska, at Fort Kearney.

The species belongs to the group of the *E. fasciatus*, having a small postnasal in front of the base of the usual larger one, and agrees with the *E. leptogrammus* Bd. in having but 24 rows of scales. The postnasal reaches the rather transverse interfrontonasal. The limbs are not very short, being separated when applied to the side by a space less than the length of the forefoot. The coloration is as follows: The median dorsal pale band covers only the adjacent halves of the two median rows of scales. A black band bordering it occupies the remaining half of the row, with the adjacent half of the next row. The remaining half of the next row is occupied by a pale band. A black line passes along the adjacent edge of the next row, whose middle is white. The external

edge of the same row is involved in the superior edge of a wide band, which covers two rows and two half rows. Thus there are three dark bands on each side of the middle line, the inferior being the widest. Altogether they only cover five and a half rows of scales on each side. There are also no lateral light bands as in many species, but the color of the abdomen extends to the lower dark band. Size rather small; length of head and body m. .070. The peculiar distribution of the color bands distinguishes this species from the *P. leptogrammus* of Baird, should the adult form of that species be found to have the paler colors of the present one.

Coluber bairdi Yarrow sp. nov. Dr. H. C. Yarrow sends me the following description of an interesting novelty from the arid region of Western Texas:

Body rather compressed. Head very broad; neck contracted. Vertical plate longer than broad, with a slight notch in anterior border; posterior portion very large, broader than long; supercilium broadest posteriorly; anterior orbital one; postorbitals two, lower largest; nine upper labials, seventh largest; lower border of orbit formed by upper margins of the fourth and fifth upper labials; lower labials twelve, seventh largest. Dorsal rows of scales 27, long and lozenge-shaped; three upper dorsal rows slightly carinated. General color above (alcoholic) warm grayish-ash; beneath yellowish; behind occipitals two converging oblong brown blotches, and posterior to these a series of narrow transverse brown blotches, eighty in number, becoming obsolete near caudal extremity; these blotches are six scales in width. Laterally below, there is a corresponding series of irregular blotches on both sides, almost obsolete. Along upper border of abdominal scutella, on both sides, are strongly marked small black blotches at intervals of 2, sometimes 3 scales. Anterior portion of abdominal scutella black, maculated; on head a black band commences at anterior margin of superciliary and extends nearly across and to nearly the entire width of the postfrontal; upper labials margined with blackish-brown posteriorly, lower labials also; a blotched line of blackish-brown extends from posterior lower angle of orbit to angle of mouth; under surface of jaw yellowish-white.

The specimen described (No. 10403, Nat. Mus. Herp., s. i) was secured near Fort Davis, Tex., by Hospital Steward von Manteuffel. This post is in the Apache Mountains, 50 miles from the Mexican border or Rio Grande, Northwest of Presidio del Norte. The species is dedicated to Prof. S. F. Baird, director Smithsonian Institution.

GENERAL OBSERVATIONS.

Various important features of the fauna of Texas require us to place it within the Nearctic realm; for although it possesses a number of genera which are common to this realm and the Neotropical, there are numerous genera which belong to the former exclusively, and very few that belong to the latter alone. In order to display these relations, I place side by side lists of the genera of vertebrates whose geographical relations are in the three directions mentioned. It is assumed for the present that the faunæ of Mexico and Central America are branches of the Neotropical.

Nearctic genera.	Mixed genera.	Neotropical genera.
Antilocapra. Ovis. Bos. Lynx. Taxidea. Blarina. Mephitia.	Cariacus. Uncia. Felis. Canis. Vulpes. Bassaris.	Dicotyles.
Castor. Cynomys. Geomys. Thomomys. Fiber.	Procyon. Ursus. Sciurus. Spermophilus. Reithrodon. Perognathus. Hesperomys. Lepus. Didelphya. Phrynosoma. Sceloporus. Anolis. Coleonyx. Gerrhonotus. Oligosoma. Tantilla. Ophibolus. Eutania. Coluber. Spilotea. Basanium. Elaps. Ancistrodon. Crotalus. Rana.	Conepatus.
Holbrookia. Crotaphytus. Eumeces.		Dasypus.
Virginia. Cyclophis. Tropidonotus. Pityophis.		Stenostoma.
Scaphiopus. Acris.		Smilisca. Lithodytes. Syrrophus.
Plethodon. Amblystoma. Diemyctylus. Siren. Scaphirhynchops. Carpiodes. Myxostoma. Notropis. Cyprinella. Etheostominae. Centrarchinae.	Engystoma. Micropterus.	

In passing, I give the following list of genera which occupy the adjacent regions of the two realms, not extending far into either. Their significance is chiefly to be considered in connection with the minor

divisions, as they have not an extensive range. Those found in Texas are marked with an asterisk:

Chilomeniscus; *Gyalopium*; *Hypsiglena*; *Phimothyra*;* *Heloderma*; *Callisaurus*; *Sauromalus*; *Uta*.*

The middle column of the three above given may be redivided into those which belong to the Mexican district alone, and those which are found both there and in one or more of the South American districts. But this discussion belongs rather to that of the relations of the Mexican fauna.

The consideration of the vertebrate fauna of Texas will be now chiefly limited to the *Mammalia*, *Reptilia*, and *Batrachia*, as the forms which are most fixed in their range and most intimately related to the physical history of the surface of the earth. The distribution of the areas of elevation and of the drainage have been already pointed out in the opening of the article. It was shown that the surface of Texas rises to the northwest, and that the strikes of the strata, as well as of the faults of the formations, have a northeast and southwest direction. It has been pointed out that the climate west of the 98th meridian is characterized by aridity, while the eastern portion of the State is supplied with abundant rains. The annual amount of rainfall on the eastern border of the State is, according to Blodgett,† fifty inches. At the meridian of the western or Mexican coast of the Gulf the amount is reduced to thirty-five inches. From this point westward the amount diminishes rapidly. Thus, in longitude 98° 30', about the border of the first plateau, the rainfall is twenty-five inches; at Fort Concho it is reduced to twenty inches, and on the high plains of the Pecos to but fifteen inches. Of course change of vegetation accompanies this climatic gradation, and animal life is modified in proportion as it is dependent on plants. Such change affects many birds and arboreal mammals, reptiles, and *Batrachia*. Of tree-livers may be especially mentioned the *Scelopori*, *spinusus* and *consobrinus*, and the *Hylæ*.

We may now place in connection with the facts of geology and climatology the distribution of the *Vertebrata* considered in the previous pages. The species will be taken up in geographical groups. These, which have been already foreshadowed, are four in number. First, those of the extreme southwest; second, those of the plateaus; and third, those of the low country and the east. These will be placed in three columns, so that the common and peculiar species may be com-

†Climatology of the United States; also, Gray's Atlas, p. 26.

pared. Some species which are found throughout the Nearctic realm (*Felis concolor*) are omitted; so, also, some whose range in Texas is insufficiently known.*

Southwestern division.	Plateau division.	Eastern and southeastern division.
<i>Taxia omia.</i> <i>Felis pardalis.</i> <i>Conepatus mapurito.</i>	<i>Felis pardalis.</i> <i>Bassaris astuta.</i> <i>Spermophilus grammurus.</i>	
<i>Dasyurus peta.</i> <i>Procytes torquatus.</i>	<i>Dicotyles torquatus.</i> <i>Antilocapra americana.</i> <i>Bos americanus.</i>	
<i>Alligator mississippiensis.</i> <i>Xerobates berlandieri.</i>		<i>Alligator mississippiensis.</i>
<i>Holbrookia propinqua.</i>	<i>Coleonyx variegatus.</i> <i>Crotaphytus collaria.</i> <i>Holbrookia texana.</i> <i> lacerata.</i> <i> maculata.</i>	<i>Anolis principalis.</i>
<i>Sceloporus scalaris.</i> <i> spinosus.</i>	<i>Uta symmetrica.</i> <i>Sceloporus consobrinus.</i> <i> spinosus.</i> <i> poinsettii.</i>	
<i>Eumeces tetragrammus.</i>	<i>Phrynosoma cornutum.</i> <i>Gerrhonotus infernalis.</i> <i>Eumeces obsoletus.</i> <i> brevilineatus.</i>	<i>Opheosaurus ventralis.</i> <i>Eumeces fasciatus.</i>
<i>Oligosoma laterale.</i>	<i>Oligosoma laterale.</i> <i>Stenostoema dulce.</i> <i>Tantilla nigriceps.</i>	<i>Oligosoma laterale.</i>
<i>Tantilla gracilis.</i>	<i>Contia episcopa.</i>	
<i>Tropidonotus clarki.</i>	<i>Rhinochilus lecontei.</i>	<i>Storeria dekayi.</i>
<i>Eutania marciana.</i>	<i>Eutania cyrtopis.</i> <i> proxima.</i>	<i>Tropidonotus clarki.</i> <i> rhombifer.</i> <i> fasciatus.</i>
<i>Cyclophis astivus.</i> <i>Rhinocentron imperialis.</i> <i>Sibon annularis.</i>	<i>Phimothya grahamia.</i>	<i>Eutania fairleyi.</i> <i>Ophiodon getulna.</i> <i> sayi.</i>
<i>Ancistrodon piscivorus.</i>	<i>Phimothya grahamia.</i>	<i>Cyclophis astivus.</i>
<i>Crotalus adamanteus.</i>	<i>Crotalus emoryi.</i>	<i>Elaps falvius.</i> <i>Ancistrodon piscivorus.</i> <i> contortrix.</i>
	<i>Ancistrodon contortrix.</i> <i>Crotalus adamanteus.</i> <i> confuentus.</i> <i>Rana halevina.</i> <i>Eryxystoma carolinense.</i> <i>Lithodytes latrans.</i> <i>Syrrophilus marmoratus.</i> <i>Chorophilus triseriatus.</i>	<i>Candisoma militaria.</i>
<i>Hyla carolinensis.</i> <i>Smilisca baudini.</i>	<i>Rana halevina.</i> <i>Eryxystoma carolinense.</i> <i>Lithodytes latrans.</i> <i>Syrrophilus marmoratus.</i> <i>Chorophilus triseriatus.</i>	<i>Eryxystoma carolinense.</i>
<i>Bufo valliceps.</i> <i>Duomyx tybas meridionalis.</i> <i>Siren lacertina.</i>	<i>Smilisca baudini.</i> <i>Scaphiopus varius.</i> <i>Bufo debilis.</i> <i> punctatus.</i> <i> valliceps.</i>	<i>Chorophilus ocellaria.</i> <i>Hyla carolinensis.</i>
		<i>Bufo valliceps.</i> <i> americanus.</i> <i>Ambystoma macrostomum.</i>

The following conclusions may be drawn from the inspection of the preceding tables. Of the twenty-two species of the extreme southwest of the State, nine are found in Mexico and six belong to the Austroriparian district of the Nearctic realm. Eight of the species are also found in the eastern portion of Texas, represented in column three; six only are distributed over the plateau region. But five species are

* The species of the Plains are considered later.

peculiar to this section, so far as known, but its boundaries on the southwest have not been ascertained.

If now we examine column three, which, though incomplete, gives a general idea of the species of the eastern part of the State, we have a list of the well-known species of the Austroriparian region, with perhaps the single exception of the *Tropidonotus clarki*, whose eastern range is unknown. We derive from this, that Texas, southeast of the first plateau, must be included in that primary region.

Forty species are enumerated as characteristic of the plateau district, and they present affinities in three directions. These are to the Mexican fauna of the Tierra Caliente, to the Sonoran fauna of Mexico and the United States, and to the fauna of the central region or that of the great plains of North America. Some of the species are peculiar to the plateaus, and others are found in all the regions named. I first indicate the relationships of the genera, omitting those which are universally Nearctic.

Mexican genera.	Sonoran genera.	Central genera.
Dicotyles.		Bos.
Bassaris.	Bassaris.	Antilocapra.
Coleonyx.	Cynomys.	Cynomys.
	Coleonyx.	
	Crotaphytus.	Holbrookia.
	Holbrookia.	
	Uta.	
Gerrhonotus.	Gerrhonotus.	
Stenostoma.	Stenostoma.	
	Phimothya.	
	Rhinochilus.	
Syrhophus.		
Lithodytes.		

From the preceding tables it is evident that the Plateau district owes the character of its fauna chiefly to the predominance of Sonoran genera. There are ten of these, four of which are also Mexican and two Central. There are two Mexican genera of frogs, but it is very uncertain whether they are widely distributed in the Plateau region. A most important difference between this and the Austroriparian region is at once apparent. No genus is peculiar to the Plateau district of Texas.

In considering the corresponding relations of the species, I add to the three already defined, a fourth list, which consists of those peculiar to the Plateau district in Texas, so far as yet imperfectly known.

Mexican.	Peculiar.	Sonoran.	Central.
<i>Felis pardalis</i> . <i>Bassaris astuta</i> .		<i>Bassaris astuta</i> . <i>Spermophilus grammurus</i> . <i>Antilocapra americana</i> .	<i>Cynomys ludovicianus</i> . <i>Antilocapra americana</i> . <i>Bos americanus</i> .
<i>Dicotyles torquatus</i> .	<i>Holbrookia lacera</i> . <i>Sceloporus spinosus</i> .	<i>Coleonyx variegatus</i> . <i>Crotaphytus collaris</i> . <i>Holbrookia texana</i> . <i>Holbrookia maculata</i> . <i>Sceloporus poinsettii</i> . <i>Uta symmetrica</i> . <i>Phrynosoma cornutum</i> .	<i>Holbrookia maculata</i> .
	<i>Gerrhonotus infernalis</i> . <i>Eumeces brevilineatus</i> . <i>Stenostoma dulce</i> . <i>Tantilla nigriceps</i> .	<i>Eumeces obsoletus</i> .	<i>Eumeces obsoletus</i> .
<i>Eutania proxima</i> .		<i>Contia episcopa</i> . <i>Rhinochilus lecontei</i> . <i>Eutania cyrtopsis</i> . <i>Phimothya grahamia</i> .	
	<i>Coluber emoryi</i> . <i>Coluber bairdi</i> . <i>Crotalus adamanteus</i> . <i>Lithodytes latrans</i> . <i>Syrrophus marnochii</i> .	<i>Crotalus confluentus</i> .	<i>Crotalus confluentus</i> .
<i>Bufo valliceps</i> .		<i>Scaphiopus varius</i> . <i>Bufo debilis</i> . <i>punctatus</i> .	<i>Chorophilus triseriatus</i> .

The summary of the above lists of the species of the Plateau district is as follows: Found in the Sonoran region, nineteen species; peculiar, eleven; found in the warm parts of Mexico, five; found in the Central region, seven. The Mexican list is reduced by the fact that one of its species is also Sonoran; and the Central list by the exclusion of four species, which are also Sonoran.

It is now evident that the characteristics of the fauna of the Plateau region of Texas refer it to the Sonora region, of the Nearctic realm, unless the number of its peculiar species is so large as to necessitate the recognition of another primary division. This course is negatived, not only by the fact already shown, that there is no genus peculiar to this district, but by the character of the list of species enumerated as peculiar to it. Of the eleven species of this list, six are rare in collections, and it is quite uncertain what the extent of their range in the district really is; but should the entire number (eleven) prove to be limited to the Plateau district it would only entitle it to be regarded as a subdivision of the great Sonoran region. The addition of *Cynomys ludovicianus*, *Bos americanus*, and *Chorophilus triseriatus* from the Central fauna, which do not occur in the typical Sonoran list, adds some weight to this conclusion. We have now attained to what has heretofore been a desideratum, the eastern limit or boundary of the Sonoran region. This, it appears, is the eastern and southern border of the Plateau district, which extends southwards to within twenty miles of San Antonio, and runs northeastward, crossing the Colorado River not far northwest of Austin, and then passes northwards, crossing the Brazos near Weatherford.

While considering the boundaries of the Sonoran region I allude to its southern limit. A collection made by Edward Wilkinson at Batopilas, in Southern Chihuahua, includes a majority of species of this fauna. These are *Phrynosoma cornutum*, *Uta ornata*, *Sceloporus couchi*, *S. tristichus*, *Eutænia cyrtopsis*, *Phimothyra grahamiæ*, *Elaps euryxanthus*. Accessions from the Mexican faunæ are only *Anolis nebulosus* and *Cyclura acanthura* of general distribution, and *Trimorphodon upsilon* heretofore from the west side of the plateau of Mexico. A peculiar snake is *Procinura æmula*.*

Collections sent by Dr. Alfredo Dugés from Guadalaxara, at the southern extremity of the northern plateau of Mexico, included five distinctive species of the Sonoran region, viz, *Bufo punctatus*, *Hyla arenicolor*, *Spea hammondi*, *Eutænia cyrtopsis*, and *Hypsiglena ochrorhynchus*. Ten other species belong to Nearctic genera, while one only, (*Cystignathus microtis*) belongs to an exclusively Neotropical genus. There are about a dozen species peculiar to the neighborhood.

In the Check List of the Reptilia and Batrachia of North America I attempted to define the Texan district of the Austroriparian region as distinct from the two other divisions of the same, the Louisianian and the Floridian, and gave a list of the genera and species, supposed to characterize it. I remarked (p. 80) that "the high northwestern regions of the State should be assigned to the Sonoran fauna," but not being aware at that time of the distribution of many species, I did not give this region sufficient extent. In accordance with the facts already adduced, it seems necessary to restrict this Texan district to the southwestern part of the State, and regard it as characterized by the list of species already given in the first column on page 44. I select from that list the following species which are, so far as now known, peculiar to it: *Testudo berlandieri*, *Holbrookia propinqua*, *Eumeces tetragrammus*, *Rhadinæa imperialis*, *Diemyctylus meridionalis*.

The Texan district will then be distinguished by the presence of these species, and the admixture of the following Mexican species: *Uncia onca*, *Felis pardalis*, *Dasyypus pcha*, *Dicotyles torquatus*, *Sceloporus scalaris*, *Sibon annulatus*, *Smilisca baudina*, *Bufo valliceps*.

* Eleventh Contribution to the Herpetology of Tropical America, by E. D. Cope, Proceed. Amer. Philos. Society, June, 1879.

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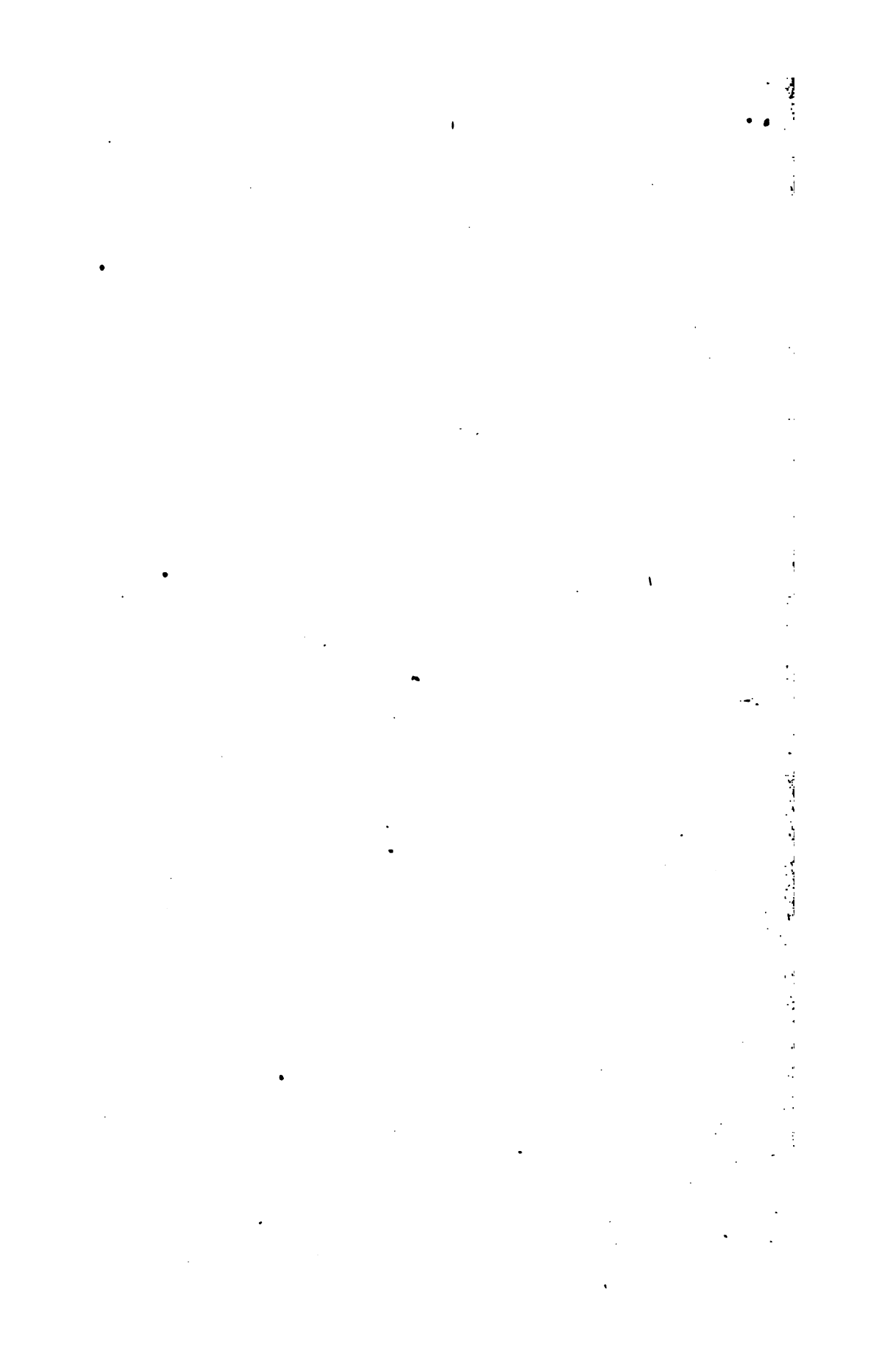
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Department of the Interior:

U. S. NATIONAL MUSEUM.



BULLETIN

OF THE

UNITED STATES NATIONAL MUSEUM.



NO. 18.—EXHIBIT OF THE FISHERIES AND FISH CULTURE OF THE
UNITED STATES OF AMERICA, MADE AT BERLIN IN 1880.

PREPARED UNDER THE DIRECTION OF

G. BROWN GOODE,

DEPUTY COMMISSIONER.



WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1880.



Department of the Interior:

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— 21 —

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OF THE

UNITED STATES NATIONAL MUSEUM.

No. 18.

PUBLISHED UNDER THE DIRECTION OF THE SMITHSONIAN INSTITUTION.

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1880.

ADVERTISEMENT.

This work is the twenty-first of a series of papers intended to illustrate the collections of natural history and ethnology belonging to the United States, and constituting the National Museum, of which the Smithsonian Institution was placed in charge by the act of Congress of August 10, 1846.

It has been prepared at the request of the Smithsonian Institution, and printed by authority of the honorable Secretary of the Interior.

SPENCER F. BAIRD,
Secretary of the Smithsonian Institution.

SMITHSONIAN INSTITUTION,
Washington, March 29, 1880.

INTERNATIONAL FISHERY EXHIBITION, BERLIN, 1880.

EXHIBIT
OF
THE FISHERIES AND FISH CULTURE

OF THE
UNITED STATES OF AMERICA,

AT THE
INTERNATIONALE FISCHEREI-AUSSTELLUNG, HELD AT BERLIN,
APRIL 20, 1880, AND FORMING A PART OF THE COL-
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MADE BY THE
UNITED STATES FISH COMMISSION.

PREPARED UNDER THE DIRECTION OF
G. BROWN GOODE,
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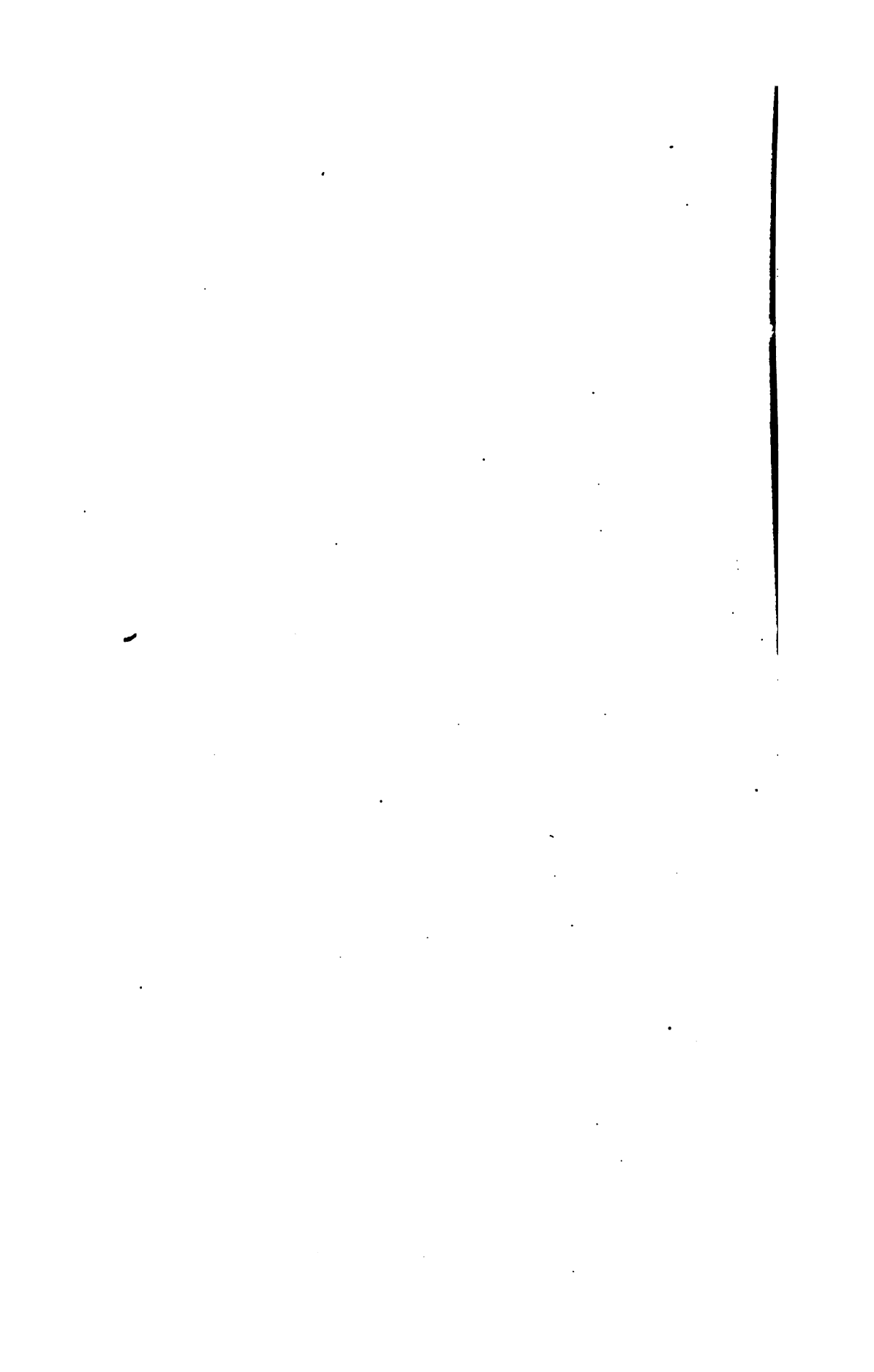


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INTRODUCTORY NOTE.

The present catalogue embraces the articles brought together by the United States Fish Commission for exhibition at the International Fishery Exhibition (*Internationale Fischerei-Ausstellung*) to be opened in Berlin on the 20th of April, 1880. The exhibit is, for the most part, a portion of that of the National Museum of the United States maintained under the direction of the Smithsonian Institution.

The idea of an international fishery exhibition to be held at Berlin under the auspices of the *Deutscher Fischerei-Verein*, had long been entertained; and an invitation to participate therein was extended more than a year ago by the German Government, to the United States, as well as to other countries. No action on the subject was taken at the time by Congress; but on the 16th of February, 1880, a resolution introduced in the House of Representatives by Mr. P. V. Deuster, of Wisconsin, and supported by Mr. L. P. Morton, of New York, which became a law, authorized the participation in the exhibition on the part of the United States, and appropriated the sum of \$20,000 for the purpose.*

*The act passed in the following words:

Whereas all civilized nations take part in the international fishery exhibition to be held in the city of Berlin, Germany, in April, eighteen hundred and eighty, it is deemed both right and expedient that the prominent and effective action of the United States in the line of the artificial propagation of fish and the stocking of depleted fishing waters should be conspicuously and well exhibited on the occasion: Therefore,

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That to enable the United States Commissioner of Fish and Fisheries to exhibit America in Berlin in April, eighteen hundred and eighty, a fair and full collection of the different specimens of American food-fishes, casts thereof, models of, and implements, and so forth, used in the prosecution of American fisheries, the sum of twenty thousand dollars is hereby appropriated, out of any moneys not otherwise appropriated in the Treasury of the United States, or so much thereof as may be necessary for the purpose, to be immediately available on the passage of this resolution, to be expended under the direction of the Secretary of State.

SEC. 2. That the United States Commissioner of Fish and Fisheries be, and is hereby, authorized to represent the United States, either in person or by a deputy to be appointed by the President of the United States; and that, at his discretion, he may use any portion of the collections at present forming part of the National Museum in making up the proposed exhibition by the United States.

SEC. 3. That the United States Commissioner of Fish and Fisheries be, and is here-

Preparations were immediately begun to utilize the few weeks remaining before the opening of the exhibition. A general invitation was extended to all parties interested, to contribute articles having any relationship to the fisheries and to fish-culture, and the special assistance of a number of persons was invoked.* The work was carried on night and day, and a first shipment made on the 4th of March, followed by others on the 20th, on which day Mr. George Brown Goode,† the deputy commissioner, with his staff,‡ left for Berlin.

With the help of the gentlemen enumerated below it has been possible, in the short time at command, to make what will probably be considered a creditable display of apparatus, subjects, and products of the American fisheries and fish-culture; this, however, would have been more complete in many respects had a longer time been allowed than the four weeks actually available.

The principal deficiency in the collection will be found in the series of American prehistoric and aboriginal implements for fishing. Of these there is a large collection in the National Museum, which could not conveniently be withdrawn. There are wanting, also, many forms of boats and vessels and numerous preparations of fish and marine products which could not be obtained within the time, and a still larger number which, from their somewhat perishable nature, could not be trusted to a sea voyage.

I take great pleasure in acknowledging the extreme liberality of the North German Lloyds in giving free freights between Baltimore and New York and Bremen of the entire fishery exhibits, at the suggestion of the New York agents, Messrs. Oelrichs & Co., who, with the Baltimore agents, Messrs. A. Schumacher & Co., have done all in their power to carry out the authority given them by the company. The Baltimore and Ohio, the Philadelphia Wilmington and Baltimore, and the Pennsylvania Railroad Companies, not to be outdone by a foreign corporation, also granted free transportation to Baltimore and New York; so that the

by, instructed to present to Congress, through the Department of State, a report upon the Berlin exhibition, showing the recent progress and present condition of the fisheries and of fish-culture in foreign countries.

*Acknowledgments for assistance in making up the exhibition are especially due to E. G. Blackford, New York; A. Howard Clark, Gloucester, Mass.; H. C. Chester and S. C. Brown, Washington, D. C.; W. A. Wilcox, Boston, Mass.; Messrs. Bradford & Anthony, Boston, Mass.; Conroy, Bissett & Malleon, W. Holberton, and Abbey & Imbrie, New York.

†Appointed deputy commissioner to the Berlin exhibition by the President.

‡Messrs. F. W. True, J. E. Rockwell, Fred. Mather, J. W. Collins, and Jos. Palmer.

whole cost of moving a collection exceeding nine thousand cubic feet, and weighing many tons, as far as Bremen at least, has been limited to the mere matter of cartage and loading.

SPENCER F. BAIRD,

United States Commissioner of Fish and Fisheries.

SMITHSONIAN INSTITUTION,

Washington, U. S. A., March 29, 1880.



SECTION A.

AQUATIC ANIMALS OF NORTH AMERICA BENEFICIAL OR INJURIOUS TO MAN. VERTEBRATES.

I. MAMMALS.

ORDER, FERÆ.

SUBORDER, FISSIPEDIA.

MUSTELIDÆ.

MUSTELINÆ.

MUSTELA PENNANTI, Erxl.—FISHER.—Northern North America.

12472. Mounted. Houlton, Maine. Rev. R. R. McLeod. Jan. 15, 1876.

PUTORIUS VISON, Rich.—MINK.—North America generally.

12432. Mounted. (Male.) Moore's Lake, Minn. J. H. Batty.

LUTRINÆ.

LUTRA CANADENSIS, Sab.—AMERICAN OTTER.—North America generally.

3380. Mounted. Ft. Steilacoom, Wash. Ter. George Gibbs.

ENHYDRINÆ.

ENHYDRIS LUTRIS, (Linn.) Gray.—SEA OTTER.—Pacific Coast of the United States.

9457. Mounted. (Adult.) Alaska. Dr. T. T. Minor.

PROCYONIDÆ.

PROCYON LOTOR, (Linn.) Storr.—RACCOON.—United States generally.

13175. Died in captivity in New York. Bought of John Wallace.

PINNIPEDIA.

OTARIIDÆ.

CALLIRHINUS URSINUS, (Schreber) Gray.—**FUR SEAL**.—North Pacific Ocean and Bering's Sea.

13086. Mounted. Alaska. Alaska Commercial Company.

EUMETOPIAS STELLERI, (Fischer) Gray.—**SEA LION**.—Pacific Coast.

13134. Mounted. (Young.) North Pacific. Alaska Commercial Company.

ZALOPHUS GILLIESPII, (Macbain) Gill.—**SEA DOG**.—Pacific Coast.

12937. Mounted. Southern California. Capt. Baker.

PHOCIDÆ.

PHOCINÆ.

PHOCA VITULINA, Linn.—**COMMON SEAL; HARBOR SEAL**.—North Atlantic.

12453. Cast. Provincetown, Mass. 1875.

PHOCA RICHARDSII, (Gray) Gill.—**LEOPARD SEAL**.—North Pacific.

12494. Mounted. Adakh Id. Alaska. W. H. Dall.

ORDER, SIRENIA

TRICHECHIDÆ.

TRICHECHUS MANATUS, Linn.—**MANATEE**.—Florida, West Indies, and N. E. South America.

12617. Cast. Florida. Zoological Society, Philadelphia.

ORDER, CETE.

DELPHINIDÆ.

DELPHINAPTERINÆ.

DELPHINAPTERUS CATODON, (Linn.) Gill.—**WHITE-FISH** or **WHITE WHALE**.—Arctic and Subarctic Seas (ascending large rivers).

12490. Cast. Gulf of St. Lawrence. G. R. Renfrew & Co., Quebec.

LAGENORHYNCHUS LEUCOPLEURUS, (Raasch) Gray.—**COW-FISH**.—Eastern Coast.

Photograph. U. S. Fish Commission.

PHOCÆNA BRACHYCION, Cope.—**SNUFFING PIG; HERRING HOG.**
—Atlantic Coast.

12302. Cast. Cape Cod. Vinal N. Edwards.
Photograph. U. S. Fish Commission.

GLOBICEPHALINÆ.**GLOBICEPHALUS INTERMEDIUS**, (Harlan) Gray.—**BLACK-FISH.**—
Atlantic Coast.

12480. Plaster cast, (7 feet.) Cape Cod. Edwards. Nov. 14, 1874.
12840. Cast 351. Cast of head. South Dennis, Mass. U. S. Fish Commission.
1875.
12841. Cast 352. Cast of head. South Dennis, Mass. U. S. Fish Commission.
1875.

GRAMPUS GRISEUS, (Cuv.) Gray.—**GRAMPUS; COW-FISH.**—North
Atlantic.

15771 ÷ 12759. Cast. Dec. 2, 1875.
15773 ÷ 12761. Cast of head and cast of whole. Nov. 30, 1875.
622. Photograph. U. S. Fish Commission.
12940. Cast of head. Cape Cod, Mass. V. N. Edwards.
12941. Cast of head. Cape Cod, Mass. V. N. Edwards.
12942. Cast of head. Cape Cod, Mass. V. N. Edwards.

BALÆNIDÆ.**BALÆNA MYSTICETUS**, Linn.—**BOWHEAD WHALE.**—Arctic Seas.

12938. Model in plaster. From drawings and measurements of Capt. C. M.
Scammon.

EUBALÆNA CULLAMACH, (Chamisso) Cope.—**PACIFIC RIGHT
WHALE.**—North Pacific.

12988. Model in plaster. From drawings and measurements of Capt. C. M.
Scammon.

ORDER, GLIRES.**MURIDÆ.****FIBER ZIBETHICUS**, Cuv.—**MUSK RAT.**—United States generally.

Mounted. District of Columbia. R. Hessel.

II. BIRDS.

NOTE.—In this series are exhibited the most widely distributed forms known to feed upon fish, particularly those peculiar to the United States. No attempt has been made to make the series complete. It also includes species used extensively as bait by fishermen on the Banks.

ORDER, PASSERES.

CINCLIDÆ.

CINCLUS MEXICANUS, Swainson.—**AMERICAN DIPPER; WATER OUSEL.**

Destructive to the eggs of fishes.

Mounted. U. S. National Museum.

CORVIDÆ.

CORVUS OSSIFRAGUS, Wilson.—**FISH CROW.**—New England to Florida, chiefly along the coast.

Mounted. U. S. National Museum.

ORDER, PICARIÆ.

ALCEDINIDÆ.

CERYLE ALOYON, (Linn.) Boie.—**BELTED KINGFISHER.**

12080. (Male.) Washington City. S. F. Baird.

75361. Washington City. Mr. Hamilton.

ORDER, RAPTORES.

FALCONIDÆ.

HALIÆTUS LEUCOCEPHALUS, (Linn.) Savigny.—**AMERICAN EAGLE; BALD EAGLE.**

42137. (Male.) Washington, D. C. C. Drexler.

PANDION HALIÆTUS, (Linn.) Savigny.—**FISH-HAWK; OSPREY.**

79093. (Male.) U. S. Carp Ponds. Washington, D. C. R. Hessel.

ORDER, GRALLATORES.

HÆMATOPODIDÆ.

HÆMATOPUS PALLIATUS, Temm.—**OYSTER-CATCHER; SEA CROW.**

29729. Hog Island, Va. R. B. Hitz.

TANTALIDÆ.**TANTALUS LOCULATOR**, Linn.—WOOD-IBIS.

Southern States. U. S. National Museum.

ARDEIDÆ.**ARDEA HERODIAS**, L.—BLUE HERON.

70057. (Young.) Fairfax Co., Va. C. Schuermann.

ARDEA EGRETTA, (Gmel.) Gray.—WHITE HERON; EGRET.

2792. Washington City. C. Drexler.

ORDER, LAMELLIROSTRES.**ANATIDÆ.****MERGUS MERGANSER**, L.—SHELDRAKE.

12785. (Male.) Potomac River. T. Tonge.

12707. (Female.) Potomac River. R. J. Pollard.

MERGUS SERRATOR, L.—FISHING-DUCK.

70281. (Male.) St. Michael's, Alaska. Lucien M. Turner.

MERGUS CUOLLATUS, L.—HOODED SHELDRAKE.

35057. (Male.) Washington, D. C. Smithsonian Institution.

70459. (Female.) Chicago, Ill. Smithsonian Institution.

ERISMATURA RUBIDA, (Wils.) Bon.—RUDDY DUCK.

76769. (Male.) Eastern U. S. American Museum Nat. History, New York.

FULIGULA VALLISNERIA, (Wils.) Stephens.—CANVAS-BACK DUCK

12712. (Male.) Potomac River. R. J. Pollard.

12713. (Female.) Potomac River. R. J. Pollard.

FULIGULA FERINA, var. **AMERICANA**, (Eyt.) Coues.—RED-HEAD DUCK.

12715. (Male.) Washington City. C. Drexler.

BUCEPHALA ALBEOLA, (L.) Baird.—BUTTER-BALL.

12696. (Male.) Washington City. C. Drexler.

ORDER, STEGANOPODES.**PELICANIDÆ.****PELICANUS FUSCUS**.—BROWN PELICAN.

78234. Florida. Tichkamatsæ.

PELICANUS TRACHYRHYNCHUS, Lath.—**WHITE PELICAN.**

71051. (Male.) Grant County, Minn. G. B. Sennett.

SULIDÆ.**SULA BASSANA**, (Linn.) Briss.—**GANNET.**

12805. Massachusetts. N. Vicary.

GRACULIDÆ.**GRACULUS DILOPHUS**, (Sw.) Gray.—**CORMORANT; SHAG.**

63249. Annapolis, Md. E. M. Schaeffer, M. D.

PLOTIDÆ.**PLOTUS ANHINGA**, L.—**SNAKE-BIRD; WATER-TURKEY.**

73526. Gulf States. U. S. National Museum.

ORDER, LONGIPENNES.**PROCELLARIIDÆ.****MORMON CIRRHATUS**.—**CRESTED PUFFIN.**

46494. (Male.) Sitka, Alaska. F. Bischoff.

FULMAREUS GLACIALIS, (L.) Stephens.—**FULMAR GULL.**

79115. (Male.) Davis Straits. N. P. Scudder.

79123. (Male.) Davis Straits. N. P. Scudder.

Used extensively as bait, being caught with the hook in large numbers.

PUFFINUS MAJOR, L.—**HAGDON.**

78175. (Male.) Grand Banks. Capt. J. W. Collins.

76294. (Female.) Cape Chadley, Hudson Straits. L. Kumlien.

Used as bait.

PUFFINUS FULIGINOSUS, Strickland.

75217. (Female.) Sable Island Bank. R. L. Newcomb.

Used as bait.

LARIDÆ.**LARUS MARINUS**, L.—**GREAT BLACK-BACKED GULL.**

17091. (Male.) New York. J. S. Bode.

LARUS ARGENTATUS, Brunn.—**HERRING GULL.**

21431. Washington City. Smithsonian Institution.

LARUS DELAWARENSIS, Ord.—**RING-BILL GULL.**

70083. Andalusia, Ill. S. C. Bowen.

LARUS CANUS, var. **BRACHYRHYNCHUS**, (Rich.) Coues.—**Mew GULL**.

52495. Kodiak, Alaska. T. Bischoff.

LARUS TRIDACTYLUS, Linn.—**KITTYWAKE GULL**.

46410. New England Coast. U. S. National Museum.

LARUS PHILADELPHIA, (Aud.) Gray.

51141. Washington City. H. Horan.

STERNA FORSTERI, Nuttall.—**MACKEREL GULL**.

66211. Lake Koskonong, Wis. L. Kumlien.

STERCORARIUS POMATORHINUS, (Temm.) Vieill.—**"GULL-CHASER."**

78173. (Female). Grand Banks. Capt. J. W. Collins.

76272. (Male). Disko, Greenland. L. Kumlien.

STERCORARIUS PARASITICUS, Brunn.—**PARASITIC JÆGER**.

78174. (Male.) Grand Banks. Capt. J. W. Collins.

STERCORARIUS BUFFONI, (Boie) Coues.—**LONG-TAILED JÆGER**.

79057. (Female.) South Greenland. Gov. Fencker.

RHYNCHOPS NIGRA, L.—**BLACK SKIMMER**.

77319. (Female.) Greene Smith.

ORDER, PYGOPODES.**COLYMBIDÆ.****COLYMBUS TORQUATUS**, Brunn.—**LOON**.

51138. (Male.) Washington City. H. Horan.

PODICIPIDÆ.**PODICEPS CORNUTUS**, Latham.—**HORNED GRABE**.

12761. Northern States. R. G. Campbell.

III. REPTILES.

ORDER, CROCODILIA.

CROCODILIDÆ.

ALLIGATOR MISSISSIPPIENSIS, Daudin.—**ALLIGATOR**.—South-eastern North America.

3980. Cast. Jacksonville, Fla. F. C. Goode.

ORDER, TESTUDINATA.

TESTUDINIDÆ.

TESTUDO CAROLINA, Linn.—**FLORIDA GOPHER-TORTOISE**.—South-eastern North America.

9627. Cast. Florida. G. Brown Goode.

EMYDIDÆ.

MALACOCLEMMYS PALUSTRIS, (Gmelin.)—**DIAMOND-BACK TERRAPIN**.—Coast from New York to Texas.

9028. Cast. Mandeville, La. G. Kohn.
Color sketch. U. S. Fish Commission.
Living specimens.

PSEUDEMYS RUGOSA, (Shaw.)—**RED-BELLIED TERRAPIN**.—New Jersey to Virginia.

8910. Cast. Kinston, N. C. J. W. Milner.
Color sketch. (Richard.) U. S. Fish Commission.
Living specimens.

PSEUDEMYS MOBILIENSIS, (Holbrook.)—**SOUTHERN TERRAPIN**.

9026. Cast. Mandeville, La. G. Kohn.

PSEUDEMYS ELEGANS, (Wied.)—Central portion of the United States.

8927. Cast. Brownsville, Tex. Dr. J. C. Merrill.

CHELOPUS GUTTATUS, (Schneider) Cope.—**SPECKLED TORTOISE**.—Eastern States.

Color sketch.

CHRYSEMYS PICTA, (Herm.) Agassiz—**PAINTED TORTOISE**.—Eastern portion of the United States.

Color sketch. (Richard.) U. S. Fish Commission.
Living specimens.

CHRYSEMYS OREGONENSIS, (Harlan) Agassiz—Central portion of the United States.

Color sketch. (Richard.) U. S. Fish Commission.

CHRYSEMYS RETICULATA, (Bosc.)—Gulf States.

Color sketch. (Richard.) U. S. Fish Commission.

CINOSTERNIDÆ.

AROMOCHELYS ODORATUS, Latreille.—“STINK POT.”—Eastern and Southern States.

Color sketch. (Richard.)

CINOSTERNUM PENNSYLVANICUM, (Bosc.) Bell.—MUD TURTLE.—Eastern States.

Color sketches. (Richard.) U. S. Fish Commission.

CHELYDRIDÆ.

MACROCHELYS LACERTINA, (Schw.)—ALLIGATOR SNAPPER.

9211. Cast. Greenville, Miss. S. W. Ferguson.

CHELYDRA SERPENTINA, (Linn.) Schw.—SNAPPING TORTOISE.—Canada to Ecuador.

9558. Cast. Oakley, S. C. F. W. Hayward.

TRIONYCHIDÆ.

ASPIDONECTES FEROX, Schw.—SOFT-SHELL TURTLE.—Georgia to Western Louisiana.

8899. Cast. Florida. Professor S. F. Baird.
Color sketch. U. S. Fish Commission.

ASPIDONECTES SPINIFER, (Les.) Agassiz—SOFT-SHELL TURTLE.—Middle and northern tributaries of the Mississippi and the Saint Lawrence.

Cast. Smithsonian Institution.

CHELONIDÆ.

CHELONIA MYDAS, Schw.—GREEN TURTLE.—Atlantic Coast south of Long Island.

8392—15267. Cast in papier-maché. New York market. E. G. Blackford.

CHELONIA VIRGATA, Schw.—PACIFIC GREEN TURTLE.—Pacific Coast.

9639. Cast. San Diego, Cal. G. N. Hitchcock.

THALASSOCHELYS CAOUANA, Linn.—LOGGERHEAD TURTLE.

8386—15259. Cast. New York market. E. G. Blackford.

ERETMOCHELYS SQUAMATA, Linn.—**PACIFIC HAWK'S BILL TURTLE**.—Pacific Coast.

12388. Shells. Fiji Island. U. S. Expl. Expedition.

SPHARGIDIDÆ.

SPHARGIS CORIACEA, Rondelet.—**LEATHERBACK TURTLE**.—Atlantic coast to Massachusetts.

8389-15266. Cast. New York market. E. G. Blackford.

ORDER, OPHIDIA.

TROPIDONOTUS RHOMBIFER, Hallow.—**WATER SNAKE**.—Central United States.

Color sketch. (Richard.)

TROPIDONOTUS TAXISPILOTUS, Holbrook.—**WATER SNAKE**.—South Atlantic States.

Color sketch. (Richard.)

TROPIDONOTUS SIPEDON, Linn.—**WATER SNAKE**.—Eastern United States.

Cast. Smithsonian Institution.

TROPIDONOTUS ERYTHROGASTER, Shaw.—**WATER SNAKE**.—Southeastern United States.

Cast. Smithsonian Institution.

IV. BATRACHIANS.

ORDER, ANURA.

RANIDÆ.

RANA CATESBIANA, Shaw.—**BULL-FROG**.

Cast. Smithsonian Institution.

ORDER, URODELA.

PROTEIDÆ.

NECTURUS LATERALIS,† Say.—**LAKE SALAMANDER**.

Living specimens.

* NOTE.—Only those species known to feed habitually on fish are here included.

† Devours eggs of *Coregonus*.

MENOPOMIDÆ.**MENOPOMA ALLEGHENIENSE**, Harl.—HELL-BENDER.

9926. Cast. Smithsonian Institution.

AMPHIUMIDÆ.**AMPHIUMA MEANS**, Linn.—MUD EEL.

Cast. Smithsonian Institution.

V. FISHES.**ORDER, PEDICULATI.****LOPHIIDÆ.****LOPHIUS PISCATORIUS**, Linn.—GOOSE FISH; ANGLER.—Nova Scotia to Cape Hatteras.Photograph. U. S. Fish Commission.
Photoengraving.**ORDER, PLECTOGNATHI.****MOLIDÆ.****MOLA ROTUNDA**, Cuv.—SUN-FISH.—Newfoundland to Cape Hatteras.

Photograph. U. S. Fish Commission.

DIODONTIDÆ.**CHILOMYCTERUS GEOMETRICUS**, (Linn.) Kaup.—BUR-FISH.—South of Cape Cod; West Indian Fauna, &c.

Color sketch. (Richard.) U. S. Fish Commission.

TETRODONTIDÆ.**TETRODON LÆVIGATUS**, (Linn.) Gill.—RABBIT-FISH.—Cape Cod to Florida.

Photograph. U. S. Fish Commission.

TETRODON SPENGLERI, Bloch.—BALLOON-FISH.—West Indian Fauna.Color sketch. Col. H. M. Drummond-Hay.
Photograph. U. S. Fish Commission.

OSTRACIDÆ.

OSTRACION QUADRICORNE, Linn.—**COW-FISH**.—West Indian Fauna.

10008. Cast. Bermudas. G. Brown Goode. March, 1872.
Color sketch. Col. H. M. Drummond-Hay.

BALISTIDÆ.

BALISTES VETULA, Linn.—**OLDWIFE**; **FILE-FISH**.—West Indian Fauna; accidental on coast.

14909. Cast. Wood's Holl, Mass. U. S. Fish Commission. Oct. 8, 1873.
Photograph. U. S. Fish Commission.

ALUTERA SCHOEPFII, (Walb.) Goode & Bean.—**ORANGE FILE-FISH**.—Cape Cod to Florida.

14915. Cast. Wood's Holl, Mass. U. S. Fish Commission. Aug. 14, 1873.
Photograph. U. S. Fish Commission.

ORDER, LOPHOBRANCHII.**HIPPOCAMPIDÆ.**

HIPPOCAMPUS ANTIQUORUM, Leach.—**SEA-HORSE**; **HORSE-FISH**.—Cape Cod to Cape Hatteras.

Photo-engraving.

SYNGNATHIDÆ.

SYNGNATHUS PECKIANUS, Storer.—**PIPE-FISH**.—Newfoundland to Cape Hatteras.

Photograph. U. S. Fish Commission.

ORDER, TELEOCEPHALI.**HETEROSOMATA.****SOLEIDÆ.**

ACHIRUS LINEATUS, (Linn.) Cuv.—**AMERICAN SOLE**; **HOG CHOKER**.—Cape Cod to Florida.

15743. Cast, (upper side.) Wood's Holl, Mass. U. S. Fish Commission. Feb. 21, 1874.

Photograph. U. S. Fish Commission.

Color sketch. Prof. Alex. Agassiz.

Photo-engraving.

PLEURONECTIDÆ.

PSEUDOPLEURONECTES AMERICANUS, (Walb.) Gill.—**FLAT-FISH; WINTER FLOUNDER.**—Nova Scotia to Cape Hatteras.

Photograph. U. S. Fish Commission.
Photo-engraving.

LIMANDA FERRUGINEA, (Storer) Goode & Bean.—**RUSTY FLOUNDER.**—Nova Scotia to Cape Cod.

Photograph. U. S. Fish Commission.

GLYPTOCEPHALUS CYNOGLOSSUS, (Linn.) Gill.—**POLE FLOUNDER.**—Maine.

Photograph. U. S. Fish Commission.
Photo-engraving.

LOPHOPSETTA MACULATA, (Mitch.) Gill.—**WATERY FLOUNDER; SPOTTED TURBOT.**—Cape Cod to Cape Hatteras.

Photograph. U. S. Fish Commission.
Color sketch. (Richard.) U. S. Fish Commission.

LEPIDOPSETTA UMBROSA, (Girard) Gill.—**Pacific coast.**

Photograph. U. S. Fish Commission.

PSEUDORHOMBUS DENTATUS, (Linn.) Günther.—**COMMON FLOUNDER.**—Cape Cod to Cape Hatteras.

10684. Cast. Wood's Holl, Mass. U. S. Fish Commission.
Photograph. U. S. Fish Commission.
Color sketch. (Schindler.) U. S. Fish Commission.
Photo-engraving.

PSEUDORHOMBUS OBLONGUS, (Mitchill) Günther.—**FOUR-SPOTTED FLOUNDER.**—Cape Cod to Cape Hatteras.

10716. Cast. Wood's Holl, Mass. U. S. Fish Commission.
Photograph. U. S. Fish Commission.
Photo-engraving.

PSEUDORHOMBUS QUADROCELLATUS, (Gill) Jordan.—**Cape Ann to Florida.**

Color sketch. (Schindler.) U. S. Fish Commission.
Photo-engraving.

HIPPOGLOSSUS VULGARIS, Fleming.—**HALIBUT.**—Newfoundland to Cape Hatteras.

15705. Cast. Eastern Massachusetts. U. S. Fish Commission.
Photograph. U. S. Fish Commission.
Photo-engraving.

HIPPOGLOSSOIDES PLATESSOIDES, (Fabr.)—**SAND DAB.**

Photo-engraving.

PLATYSOMATICHTHYS HIPPOGLOSSOIDES, (Walb.) Goode & Bean.—GREENLAND TURBOT.—Greenland.

14869. Cast. Newfoundland. E. G. Blackford. Feb., 1874.
 Photograph. U. S. Fish Commission.
 Photo-engraving.

PSETTICHTHYS MELANOSTICTUS, Girard.—CALIFORNIA "SPOTTED SOLE."—Coast of California.

Photographs. U. S. Fish Commission.

PLATICHTHYS STELLATUS, (Pall.) Gill.—ROUGH FLOUNDER.—Coast of California.

Photograph. U. S. Fish Commission.
 Color sketch. (Agassiz.) San Francisco. Prof. Alex. Agassiz. Nov., 1859.

ANACANTHINI.**MACRURIDÆ.****MACRURUS FABRICII, Sundevall.—ONION-FISH.—North Atlantic.**

Photo-engraving.

MACRURUS RUPESTRIS, (Bloch.)—North Atlantic.

Photo-engraving.

MACRURUS BAIRDII, Goode & Bean.—SPIKE-TAIL.—North Atlantic.

Photo-engraving.

GADIDÆ.**POLLACHIUS CARBONARIUS, (Linn.) Bon.—POLLACK.—Greenland to Cape Hatteras.**

Photographs. U. S. Fish Commission.
 Photo-engraving.

GADUS MORRHUA, Linn.—COD-FISH.—Polar Regions to Cape Hatteras.

Color sketch. Albino. (Schindler.)
 Photograph. U. S. Fish Commission.
 Color sketch. Prof. Alex. Agassiz.
 22274. Cast. U. S. Fish Commission.
 Photo-engraving.

MICROGADUS PROXIMUS, (Girard) Gill.—TOM COD.—Coast of California.

Photograph. U. S. Fish Commission.

MICROGADUS TOMCODUS, (Walb.) Gill.—TOM COD; FROST-FISH.—Newfoundland to Cape Hatteras.

14884. Cast. Wood's Holl, Mass. U. S. Fish Commission. June 11, 1873.
 Color sketch. (Richard.) U. S. Fish Commission.
 Photo-engraving.

MELANOGRAMMUS ÆGLEFINUS, (Linn.) Gill.—**HADDOCK**.—Newfoundland to Cape Hatteras.

Photograph. U. S. Fish Commission.
Photo-engraving.

PHYCIS CHUSS, (Walb.) Gill.—**HAKE**.—Newfoundland to Cape Hatteras.

Photograph. U. S. Fish Commission.

PHYCIS TENUIS, (Mitch.) De Kay.—**SQUIRREL HAKE**.—Newfoundland to Cape Hatteras.

Photograph. U. S. Fish Commission.
Photo-engraving.

PHYCIS CHESTERI, Goode & Bean.—**LONG-FINNED HAKE**.

Photograph. U. S. Fish Commission.
Photo-engraving.

PHYCIS REGIUS, (Walb.) Jord. & Gilbert.—**SPOTTED CODLING**.—Cape Cod to Cape Hatteras.

Photo-engraving.

BROSMIUS BROSME, Les.—**CUSK**.—Nova Scotia to Cape Cod.

16605. Cast. Boston, Mass. Wm. Prior, jr., & Co. Sept. 25, 1875.

Photograph. U. S. Fish Commission.

HALOPORPHYRUS VIOLA, Goode & Bean.—**BLUE HAKE**.

Photo-engraving.

LOTA MACULOSA, (Les.) Rich.—**BURBOT**.—Fresh waters of Northern North America.

Color sketch. (Rötter.) Prof. Alex. Agassiz.

Photo-engraving.

MERLUCHIDÆ.

MERLUCIUS BILINEARIS, (Mitch.) Gill.—**WHITING; SILVER HAKE**.—Nova Scotia to Cape Hatteras.

Photograph. U. S. Fish Commission.

Color sketch. Prof. Alex. Agassiz.

LYCODIDÆ.

ZOARCES ANGUILLARIS (Peck) Storer.—**EEL POUT**.—Newfoundland to Cape Hatteras.

(Color sketch.) U. S. Fish Commission.

LYCODES TURNERI, Bean.—Alaska.

Photo-engraving.

LYCODES VERRILLI, Goode and Bean.—North Atlantic.

Photo-engraving.

LYCODES PAXILLUS, Goode and Bean.—North Atlantic coast.

Photo-engraving.

LYCODES VAHLII, Reinhardt.—North Atlantic.

Photo-engraving.

CRYPTACANTHIDÆ.**CRYPTACANTHODES MACULATUS**, Storer.—SPOTTED WEY-
MOUTH. Nova Scotia to Cape Cod.

Color sketch. Alex. Agassiz.

Photo-engraving.

AMMODYTIDÆ.**AMMODYTES AMERICANUS**.—SAND EEL.

Photograph. U. S. Fish Commission.

STICTEIDÆ.**EUMESOGRAMMUS SUBBIFURCATUS** (Storer) Gill.—Nova Sco-
tia to Cape Cod.

Photo-engraving.

XIPHIIDIONTIDÆ.**MURÆNOIDES GUNELLUS**, (Linn.) Goode and Bean.—ROCK EEL.—
Nova Scotia to Cape Hatteras.

Photo-engraving.

ANARRHICHADIDÆ.**ANARRHICHAS MINOR**, Olafsen.—WOLF-FISH.—Greenland to
Cape Hatteras.

Photo-engraving.

ANARRHICHAS LUPUS, Linn.—BANDED WOLF-FISH.—North At-
lantic.

Photo-engraving.

BATRACHIDÆ.**BATRACHIUS TAU**, Linn.—TOAD-FISH; OYSTER-FISH.—Nova Scotia
to Gulf of Mexico.

Color sketch. (Richard.) U. S. Fish Commission.

PORICHTHYS NOTATUS. Pacific Coast.Color sketch. (Agassiz.) Simiahmoo, Wash. Terr. Prof. Alex. Agassiz.
June, 1859.

URANOSCOPIDÆ.

ASTROSCOPUS ANOPLUS (Cuv. & Val.) Brevoort.—**NAKED STAR-GAZER.**—New York to Florida.

Color sketch.

CYCLOPTERIDÆ.

CYCLOPTERUS LUMPUS, Linn.—**LUMP-FISH.**—North Atlantic.

15688. Cast. New York. E. G. Blackford. May 15, 1874.

Photograph. U. S. Fish Commission.

LIPARIDIDÆ.

LIPARIS LINEATA, (Lepechin) Kroyer.—**STRIPED LIPARIS.**—North Atlantic.

(Color sketch.)

EUMICROTREMUS SPINOSUS, (Fabricus) Gill.—**North Atlantic Coast.**

Photo-engraving.

TRIGLIDÆ.

DACTYLOPTERUS VOLITANS, (Linn.) Lacep.—**FLYING GURNARD.**
Temperate and Tropical Atlantic and Mediterranean.

Color sketch.

PRIONOTUS CAROLINUS, (Linn.) Cuv. & Val.—**BROAD-FINGERED SEA ROBIN.**—Cape Cod to Florida.

Photograph. U. S. Fish Commission.

Color sketch. (Burkhardt.) Prof. Alex. Agassiz.

Photo-engraving.

PRIONOTUS EVOLANS, (Linn.) Gill.—**STRIPED SEA ROBIN.**—Cape Cod to Florida.

Photograph. U. S. Fish Commission.

Color sketch. (Richard.) U. S. Fish Commission.

AGONIDÆ.

ASPIDOPHOROIDES MONOPTERYGIUS, (Bloch.) Storer.—**Polar Seas and south to Connecticut.**

(Pen sketch.)

COTTIDÆ.

COTTUS OCTODECIMSPINOSUS, Mitch.—**SCULPIN.**—Nova Scotia to Cape Hatteras.

Photograph. U. S. Fish Commission.

Photo-engraving.

**COTTUS GRÖENLANDICUS, Cuv. & Val.—GREENLAND SCULPIN.—
Polar Regions to Cape Cod.**

Photograph. U. S. Fish Commission.
Photo-engraving.

COTTUS ÆNEUS, Mitchill.—PIGMY SCULPIN.—New England Coast.

Photograph. U. S. Fish Commission.

**URANIDEA VISCOSA, (Hald.) DeKay.—AMERICAN MILLER'S
THUMB.**

Color sketch. (Roetter.) Plymouth, Mass. Prof. Alex. Agassiz. March,
1869.

MELLETES PAPILIO, Bean.—Alaska.

Photo-engraving.

**CENTRIDERMICHTHYS UNCINATUS, (Reinh.) Günther.—North
Atlantic.**

Photo-engraving.

TRIGLOPS PINGELII, Reinh.—North Atlantic.

Photo-engraving.

HEMITRIPTERIDÆ.**HEMITRIPTERUS AMERICANUS, (Gmel.) Cuvier.—SEA RAVEN.—
Newfoundland to New York; Seas of Japan.**

15736. Cast. Wood's Holl, Mass. U. S. Fish Commission.
Photograph. U. S. Fish Commission.
Color sketch. (Richard.) U. S. Fish Commission.
Photo-engraving.

SCORPÆNIDÆ.**SEBASTES MARINUS, (Linn.) Lütken.—NORWAY HADDOCK; HEM-
DURGAN; RED PERCH.—Polar Seas and south to Cape Cod.**

23206. Cast. Gloucester, Mass. U. S. Fish Commission.
Photograph. U. S. Fish Commission.
Photo-engraving.

**SEBASTOMUS ROSACEUS, (Girard) Gill.—ROSY ROCK-FISH.—Coast
of California.**

Photograph. U. S. Fish Commission.

**SEBASTOMUS AURICULATUS, (Girard) Gill.—BLACK-EARED ROCK-
FISH.—Coast of California.**

Color sketch.

**SEBASTOMUS FASCIATUS, (Girard) Gill.—BANDED ROCK-FISH.—
Coast of California.**

SEBASTOMUS ELONGATUS, (Girard) Gill.—Pacific Coast.

Color sketch. (Agassiz.) San Francisco. Prof. Alex. Agassiz. Nov., 1859.

SEBASTOSOMUS MELANOPS, (Girard) Gill.—BLACK-HEADED ROCK-FISH.—Coast of California.

Color sketch. (Agassiz.) San Francisco. Prof. Alex. Agassiz. Nov., 1859.

SEBASTODES PAUCISPINIS, (Ayres) Gill.—Coast of California.

Color sketch. (Agassiz.) San Francisco. Prof. Alex. Agassiz. Nov., 1859.

CHIRUS CONSTELLATUS, (Girard) Gill.—"ROCK TROUT."—Coast of California.

Photograph. U. S. Fish Commission.

CHIRUS PICTUS, Girard.—Pacific Coast.

Color sketch. (Agassiz.) San Francisco. Prof. Alex. Agassiz. Nov., 1859.

CHIRUS GUTTATUS, Girard.—Coast of California.

Color sketch. Prof. Alex. Agassiz.

SCARUS RADIANS, Val.—SPANISH POGGY.—West Indian Fauna.

Color sketch. (Burkhardt.) New Providence. Prof. Alex. Agassiz; F. S. Shaw. April, 1861.

SCARIDÆ.**PSEUDOSCARUS QUADRISPINOSUS**, (Cuv. & Val.) Guich.—RAINBOW FISH.—West Indian Fauna.

Color sketch. Col. H. M. Drummond-Hay.

PSEUDOSCARUS, sp.—PARROT-FISH.—West Indian Fauna.

25100. Cast. New York market. E. G. Blackford.

Color sketch. (Richard.) U. S. Fish Commission.

LABRIDÆ.**TAUTOGA ONITIS**, (Linn.) Günther.—TAUTOG; BLACK-FISH.—Bay of Fundy to South Carolina.

10643. Cast. Wood's Holl, Mass. U. S. Fish Commission.

Photograph. U. S. Commission.

Color sketch. Prof. Alex. Agassiz.

Photo-engraving.

TAUTOGOLABRUS ADSPERSUS, (Walb.) Gill.—CUNNER; CHOG-SET.—Newfoundland to Cape Hatteras.

Cast. Wood's Holl, Mass. U. S. Fish Commission.

Photograph. U. S. Fish Commission.

Photo-engraving.

HARPE BUFUS, (Linn.) Gill.—SPANISH LADY-FISH.—West Indian Fauna.

Color sketch. Col. H. M. Drummond-Hay.

CHÆROJULIS RADIATUS, (Linn.) Goode.—BLUE-FISH.—West Indian Fauna.

Color sketch. Col. H. M. Drummond-Hay.

LACHNOLÆMUS FALCATUS, (Linn.) Val.—West Indian Fauna.

Color sketch. Col. H. M. Drummond-Hay.

POMACENTRIDÆ.

GLYPHIDODON SAXATILIS, (Linn.) Cuv.—SERGEANT-MAJOR.—West Indian Fauna.

Color sketch. Col. H. M. Drummond-Hay.

EMBIOTOCIDÆ.

EMBIOTOCA WEBBI, Girard.—Coast of California.

Color sketch. U. S. Fish Commission.

EMBIOTOCA JACKSONI, Agassiz.—Coast of California.

Color sketch. (Agassiz.) San Francisco. Prof. Alex. Agassiz. Nov., 1859.

TÆNIOTOCA LATERALIS, (Ag.) A. Ag.—STRIPED PERCH.—Coast of California.

Photograph. U. S. Fish Commission.

DAMALICHTHYS VACCA, Girard.—Coast of California.

Color sketch. (Agassiz.) San Francisco. Prof. Alex. Agassiz. April, 1860.

METROGASTER AGGREGATUS, Ag.—Pacific Coast.

Color sketch. (Female.) (Agassiz.) San Francisco, Cal. Prof. Alex. Agassiz. Dec., 1859.

HYPSURUS CARYI, Ag.—PERCH.—Pacific Coast.

Color sketch. San Francisco, Cal. Prof. Alex. Agassiz. April 1, 1860.

PHANERODON FURCATUS, Girard.—Coast of California.

Color sketch. (Female.) (Agassiz.) San Francisco. Prof. Alex. Agassiz. Nov., 1859.

AMPHISTICHUS ARGENTEUS, Ag.—Coast of California.

(Color sketch.)

AMPHISTICHUS SIMILIS, Girard.—Coast of California.

(Color sketch.)

HOLCONOTUS PULCHELLUS, A. Ag.—Coast of California.

Color sketch. (Male.) (Agassiz.) San Francisco. Prof. Alex. Agassiz.
April, 1860.
Color sketch. Prof. Alex. Agassiz.

HOLCONOTUS RHODOTERUS, Girard.—Coast of California.

Color sketch. (Female.) (Agassiz.) San Francisco. Prof. Alex. Agassiz.
Dec., 1859.

HYPERPROSOPON ARGENTEUS, Gibbon.—Coast of California.

Color sketch. (Female.) (Agassiz.) San Francisco. Prof. Alex. Agassiz.
March, 1860.
Color sketch. (Female.) (Agassiz.) San Francisco. Prof. Alex. Agassiz.
April, 1860.
Color sketch. Prof. Alex. Agassiz.

CHÆTODONTIDÆ.**CHÆTODON CAPISTRATUS**, Linn.—COQUETTE.—West Indian Fauna.

(Color sketch.)

HOLACANTHUS CILIARIS, (Linn.) Lac.—ANGEL-FISH.—West Indian Fauna.

Color sketch. Col. H. M. Drummond-Hay.

POMACANTHUS ARCUATUS, (Linn.) Cuv.—PALOMETTA.—West Indian Fauna.

Color sketch. (Burkhardt.) Florida. Prof. Alex. Agassiz. Alive in
Boston Aquarial Garden. June, 1860.

XIPHIIDÆ.**XIPHIAS GLADIUS**, Linn.—SWORD-FISH.—Atlantic and Mediterranean.

Swords.

TETRAPTURUS ALBIDUS, Poey.—SPIKE-FISH.—Cape Cod to West Indies.

Photograph. U. S. Fish Commission.

HISTIOPHORUS AMERICANUS, Cuv. & Val.—SAIL-FISH.—Atlantic Coast of America.

Photograph. U. S. Fish Commission.

TRICHIURIDÆ.**TRICHIURUS LEPTURUS**, Linn.—HAIR-TAIL; SCABBARD-FISH.—Temperate and Tropical Atlantic.

Photo-engraving.

SCOMBRIDÆ.**SCOMBER SCOMBRUS, Linn.—MACKEREL.—Northern Atlantic.**

Photograph. U. S. Fish Commission.

Color sketch. Prof. Alex. Agassiz.

“The Mackerel.” Original painting by S. A. Kilbourne for Kilbourne & Goode’s “Game Fishes of the United States.” Exhibited by Charles Scribner’s Sons, New York.

“The Mackerel.” Lithograph in water colors. Illustration to Kilbourne & Goode’s “Game Fishes of the United States.” Exhibited by Charles Scribner’s Sons, New York.

SARDA PELAMYS, (Linn.) Cuv.—BONITO.—Atlantic and Mediterranean.

16325. Cast. Wood’s Holl, Mass. U. S. Fish Commission.

Photograph. U. S. Fish Commission.

Color sketch. New York. Prof. Alex. Agassiz. Oct. 20, 1847.

ORCYNUS THYNNUS, (Linn.) Goode.—TUNNY; HORSE-MACKEREL.—Newfoundland to Florida.

Photograph. U. S. Fish Commission.

Color sketches. (Richard.) U. S. Fish Commission.

ORCYNUS ALLITERATUS, (Raf.) Gill.—LITTLE TUNNY; ALBICORE.—Pelagic.

Photograph. U. S. Fish Commission.

Color sketch. Col. H. M. Drummond-Hay.

ORCYNUS PELAMYS, (Linn.) Poey.—OCEANIC BONITO.—Temperate and Tropical Seas.

Color sketch. (Richard.) U. S. Fish Commission.

Photo-engraving.

ORCYNUS ALALONGA, (Gmelin) Risso.—LONG-FINNED BONITO.—Atlantic, Mediterranean.

Photo-engraving.

CYBIUM MACULATUM, (Mitch.) Cuv.—SPANISH MACKEREL.—Atlantic shores of Tropical and Temperate America.

15367. Cast. Norfolk, Va. U. S. Fish Commission.

Photograph. U. S. Fish Commission.

Photo-engraving.

“The Spanish Mackerel.” Lithograph in water colors. Illustration from Kilbourne and Goode’s “Game Fishes of the United States.” Exhibited by Charles Scribner’s Sons, New York.

CYBIUM REGALE, (Bl.) Cuv.—SPOTTED CERO.—West Indian Fauna and north to Cape Cod.

Photograph.

Photo-engraving.

CYBIUM CABALLA, Cuv. & Val.—**CERO**.—Atlantic shores of Tropical and Temperate America.

Photograph. U. S. Fish Commission.
Photo-engraving.

CARANGIDÆ.

NAUCRATES DUCTOR, L.—Temperate and Tropical Seas.

Photo-engraving.

VOMER SETIPINNIS, (Mitch.) Ayres.—**SILVER-FISH**.—Maine to Florida. West Indian Fauna.

(Sketch.)

ARGYREIOSUS VOMER, Lac.—**SILVER-FISH**.—Cape Cod to Florida, and West Indian Fauna.

Photograph. U. S. Fish Commission.

TRACHURUS SAURUS, (Rafinesque).—**SCAD**.—Europe and Massachusetts.

Photo-engraving.

SELENE ARGENTEA, Lac.—**MOON-FISH**.—Southern Coast.

Photo-engraving.

TRACHUOPS CRUMENOPHTHALMUS, (Bloch.) Gill.—**BIG-EYED SCAD**; **GOGGLE-EYE**.—Pelagic.

Photograph. U. S. Fish Commission.
Color sketch. Col. H. M. Drummond-Hay.

DECAPTERUS MACARELLUS, (C. & V.) Gill.—**MACKEREL SCAD**.—West Indian Fauna and north to Massachusetts.

Photo-engraving.

CARANGUS PISQUETUS, (C. & V.)—**YELLOW CREVALLÉ**.—Cape Cod to Florida.

Photograph. U. S. Fish Commission.

CARANGUS HIPPOS, (Linn.) Gill.—**HORSE CREVALLÉ**.—Atlantic Coasts of Temperate and Tropical America, East Indian, and Australian Seas.

14850. Cast. Florida. E. G. Blackford.
Photograph. U. S. Fish Commission.
Photo-engraving.

CARANGUS CHRYSOS, (Mitch.) Gill.—**YELLOW MACKEREL**.—West Indian Fauna and north to Cape Cod.

Photograph. U. S. Fish Commission.

BLEPHARIS CRINITUS, (Akerly) Gill.—**THREAD-FISH**.—West Indian Fauna and north to Cape Cod.

Photographs. U. S. Fish Commission.

Color sketch. (Richard.) U. S. Fish Commission.

TRACHYNOTUS CAROLINUS, (Linn.) Gill.—**POMPANO**.—Atlantic Coasts of America south of Cape Cod.

15809. Cast. New York market. E. G. Blackford.

Photograph. U. S. Fish Commission.

"The Pompano." Lithograph in water colors. Illustration for Kilbourne & Goode's "Game Fishes of the United States." Exhibited by Charles Scribner's Sons, New York.

TRACHYNOTUS OVATUS, (Linn.) Gthr.—**ROUND POMPANO**.—Pelagic.

16707. Cast. New York. E. G. Blackford.

Color sketch. (Schindler.) U. S. Fish Commission.

TRACHYNOTUS GOREENSIS, Cuv. & Val.—**AFRICAN POMPANO**.—Tropical Atlantic.

23351. Cast.

Color sketch. (Richard.) U. S. Fish Commission.

TRACHYNOTUS GLAUCUS, Cuv. & Val.—**BANNER POMPANO**.—Atlantic and Pacific coasts of Tropical America.

Color sketch. (Richard.) U. S. Fish Commission.

CHLOROSCOMBRUS CHRYSURUS, (Linn.) Gill.

Photo-engraving.

SERIOLA ZONATA, (Mitch.) Cuv. & Val.—**BANDED RUDDER-FISH**.—Cape Cod to Florida.

Photograph. U. S. Fish Commission.

SERIOLA LALANDII, C. & V.—**AMBER-FISH**.—Atlantic Ocean; Japan.

Photograph. U. S. Fish Commission.

OLIGOPLITES OCCIDENTALIS, (Linn.) Gill.—**LEATHER JACKET**.—West Indies; occasional on coast.

Photograph. U. S. Fish Commission.

CORYPHÆNIDÆ.**CORYPHÆNA SUEURI**, Cuv. & Val.—**DOLPHIN**.—Pelagic; occasional on coast.

Color sketch. (Richard.) U. S. Fish Commission.

CORYPHÆNA PUNCTULATA, (Cuv. & Val.) Gthr.—**SMALL-SPOTTED DOLPHIN**.—Pelagic; occasional on coast.

16406. Cast. Noank, Conn. J. H. Latham. Aug. 25, 1875.

NOMEIDÆ.

NOMEUS GRONOVII, (Gmel.) Günther.

Color sketch. Col. H. M. Drummond-Hay.

STROMATEIDÆ.

PALINURICHTHYS PERCIFORMIS, (Mitch.) Gill.—**BLACK RUD-
DER-FISH.**—Newfoundland to Cape Hatteras.

Color sketch. (Richard.) U. S. Fish Commission.

PORONOTUS TRIACANTHUS, (Peck.) Gill.—**HARVEST-FISH ; BUT-
TER-FISH.**—Maine to Cape Hatteras.

16571. Cast. Wood's Holl, Mass. U. S. Fish Commission.

Photograph. U. S. Fish Commission.

Color sketches. Alex. Agassiz.

PEPRILUS ALEPIDOTUS, (Linn.) Cuv.—**SHORT HARVEST-FISH.**—
West Indian Fauna and north to New York.

Color sketch.

LATILIDÆ.

CAULOLATILUS MICROPS, Goode & Bean.—Gulf of Mexico.

Photo-engraving.

LOPHOLATILUS CHAMÆLEONTICEPS, Goode & Bean.

23345. Cast. Off Noman's Land. Capt. W. H. Kirby.

Photo-engraving.

BERYCIDÆ.

HOLOCENTRUM RUFUM, (Linn.) Goode.—**SQUIBBEL.** West Indian
Fauna, accidental on coast; found at Newport, R. I.

Color sketch. Col. H. M. Drummond-Hay.

SCIAENIDÆ.

CYNOSCION REGALIS, (Bl.) Gill.—**SQUETEAGUE ; WEAK-FISH.**—
Cape Ann to Florida.

16216. Cast. Wood's Holl, Mass. U. S. Fish Commission. July 27, 1875.

Photograph. U. S. Fish Commission.

"The Squeteague, or Weak-Fish." Original painting in water colors by
S. A. Kilbourne for Kilbourne & Goode's "Game Fishes of the United
States." Exhibited by Charles Scribner's Sons, New York.

"The Squeteague, or Weak-Fish." Lithograph in water colors. Illus-
tration for Kilbourne & Goode's "Game Fishes of the United States."
Exhibited by Charles Scribner's Sons, New York.

CYNOSCION CAROLINENSIS, (Cuv. & Val.) Gill.—**SPOTTED SQUE-
TEAGUE.**—Gulf of Mexico and Southern Atlantic States.

10737. Cast. Southern Coast. U. S. Fish Commission.

Photograph. U. S. Fish Commission.

POGONIAS CHROMIS, Lacep.—**DRUM**.—Cape Cod to Florida; Gulf of Mexico.

15686. Cast. Fisher's Island Sound. Charles Potter. July 10, 1874.
 Photograph. U. S. Fish Commission.

HAPLOIDONOTUS GRUNNIENS, Raf.—**FRESH-WATER DRUM**.—Great Lakes and Mississippi Valley.

15669. Cast. Mississippi Valley. U. S. Fish Commission.
 Photograph. U. S. Fish Commission.
 Photo-engraving.

LIOSTOMUS OBLIQUUS, (Mitch.) De Kay.—**SPOT**.—Cape Cod to Florida.

15816. Cast. Norfolk, Va. U. S. Fish Commission.
 Photograph. U. S. Fish Commission.

LIOSTOMUS XANTHURUS, Lacep.—**YELLOW-TAILED SPOT**.—Southern Atlantic States.

Photograph. U. S. Fish Commission.

BAIRDIELLA PUNCTATA, (Linn.) Gill.—**SILVER-FISH; YELLOW TAIL**.—Cape Cod to Florida.

Photograph. U. S. Fish Commission.

SCIAENOPS OCELLATUS, (Linn.) Gill.—**RED BASS; SPOTTED BASS**.—Cape Cod to Florida; Gulf of Mexico.

15739. Cast. New York. E. G. Blackford.
 Photograph. U. S. Fish Commission.

MENTICIRRUS ALBURNUS, (Linn.) Gill.—**SOUTHERN KING-FISH**.—Cape Hatteras to Florida.

Photograph. U. S. Fish Commission.

MENTICIRRUS NEBULOSUS, (Mitch.) Gill.—**KING-FISH**.—Cape Cod to Florida.

16219. Cast. Wood's Holl, Mass. U. S. Fish Commission. July 27, 1875.
 Photograph. U. S. Fish Commission.
 Color sketches. (Richard.) U. S. Fish Commission.

MICROPOGON UNDULATUS, (Linn.) Cuv. & Val.—**CROAKER**.—Atlantic Coasts of America south of Cape Cod.

15810. Cast. Norfolk, Va. U. S. Fish Commission. July 18, 1873.
 Photograph. U. S. Fish Commission.

PIMELEPTERIDÆ.**PIMELEPTERUS BOSCHII**, Lacep.—**BREAM**.—West Indian Fauna and north to Cape Cod.

Photo-engraving.

SPARIDÆ.

LAGODON RHOMBOIDES, (Linn.) Holbrook.—**SAILOR'S CHOICE**.—
West Indian Fauna and north to Cape Cod.

(Color sketch.)

ARCHOSARGUS PROBATOCEPHALUS, (Walb.) Gill.—**SHEEPS-HEAD**.—Cape Cod to Florida; Gulf of Mexico.

15826. Cast. New York market. E. G. Blackford. October 14, 1875.

Photograph. U. S. Fish Commission.

Color sketch. (Richard.) U. S. Fish Commission.

STENOTOMUS ARGYROPS, (Linn.) Gill.—**SCUPPAUG; SCUP;**
PORGY.—Cape Ann to Florida.

10724. Cast. Wood's Holl, Mass. U. S. Fish Commission.

Photograph. U. S. Fish Commission.

Photo-engraving.

SARGUS HOLBROOKII, Bean.—**CHARLESTON BREAM**.—Carolinæ.

Photo-engraving.

PRISTIPOMATIDÆ.

HÆMULON ARCUATUM, Cuv. & Val.—**BLUE-CHEEKED RED-MOUTH**.—South Atlantic Coast of United States.

14907. Cast. Florida. E. G. Blackford.

ANISOTREMUS VIRGINICUS, (Linn.) Gill.—South Atlantic Coast
of United States.

Color sketch.

LUTJANUS BLACKFORDII, Goode & Bean.—**RED SNAPPER**.—
Gulf of Mexico and north to Savannah Bank.

15700. Cast. New York market. E. G. Blackford. May 7, 1874.

Photograph. U. S. Fish Commission.

Photo-engraving.

"The Red Snapper." Lithograph in water colors. Illustration from
Kilbourne & Goode's "Game Fishes of the United States." Exhibited
by Charles Scribner's Sons, New York.

RHOMBOPLITES AUORUBENS, (Cuv. & Val.) Gill.—**MANGROVE
SNAPPER**.—West Indian Fauna.

Photo-engraving.

OCYURUS CHRYSURUS, (Bl.) Gill.—**GOLDEN TAIL**.—West Indian
Fauna.

Photograph. U. S. Fish Commission.

CENTRARCHIDÆ.

EUPOMOTIS AUREUS, (Walb.) Gill & Jordan.—**SUN-FISH**.—Fresh
waters of Eastern North America.

Photograph. U. S. Fish Commission.

Color sketch. (Richard.) U. S. Fish Commission.

POMOXYS NIGROMACULATUS, (Les.) Girard.—GRASS BASS.—
Great Lakes, Mississippi Valley, and Southern Atlantic States.

17969. Cast. Wilmington, N. C. S. F. Baird.
Photograph. U. S. Fish Commission.
Color sketch. (Richard.) U. S. Fish Commission.
Photo-engraving.

AMBLOPLITES RUPESTRIS, (Raf.) Gill.—ROCK BASS.—Great Lakes
and Mississippi Valley.

Photograph. U. S. Fish Commission.

MESOGONISTIUS CHÆTODON, (Baird) Gill.—BLACK-BANDED SUN
FISH.—New Jersey to Maryland.

Photo-engraving.

MICROPTERUS PALLIDUS, (Raf.) Gill & Jordan.—LARGE-MOUTH
BLACK BASS.—Great Lakes, Mississippi River and tribu-
taries; Southern States; introduced northward.

Cast. U. S. Fish Commission.
Photograph. U. S. Fish Commission.
Photo-engraving.

“The Large-mouth Black Bass.” Lithograph in water colors. Illustration from Kilbourne & Goode’s “Game Fishes of the United States.” Exhibited by Charles Scribner’s Sons, New York.

MICROPTERUS SALMOIDES, (Lac.) Gill.—SMALL-MOUTHED BLACK
BASS.—Great Lakes and Mississippi Valley; introduced eastward.

15297. Cast. Potomac River. Maj. Hobbs.
Color sketch. (Richard.) U. S. Fish Commission.

PERCIDÆ.

PERCA FLUVIATILIS, L.—YELLOW PERCH.—Fresh waters of East-
ern United States and Western Europe.

14976. Cast. Washington Market. G. Brown Goode. Feb. 27, 1875.
Photograph. U. S. Fish Commission.
Photo-engraving.

“The Yellow Perch.” Lithograph in water colors. Illustration from Kilbourne & Goode’s “Game Fishes of the United States.” Exhibited by Charles Scribner’s Sons, New York.

STIZOSTEDIUM VITREUM, (Mitch.) Jordan & Copeland, (Val.) Cope.
—YELLOW PIKE-PERCH.—Fresh waters of Central United States.

Color sketch. (Roetter.) Sackett’s Harbor, N. Y. Prof. Alex. Agassiz.
Nov., 1868.
Photograph. U. S. Fish Commission.

STIZOSTEDIUM CANADENSE, (Smith) Jordan.—**CANADA PIKE-PERCH**.—St. Lawrence River to the Upper Missouri.

Photograph. U. S. Fish Commission.

SERRANIDÆ.

EPINEPHELUS MORIO, (Cuv.) Gill.—**RED-BELLIED SNAPPER**.—West Indian Fauna and Southern Atlantic States.

Photograph. U. S. Fish Commission.
Photo-engraving.

EPINEPHELUS DRUMMOND-HAYI, Goode & Bean.—**STAR SNAPPER**; **JOHN PAW**.—West Indian Fauna to Savannah.

Color sketch. Bermuda. Col. H. Drummond-Hay.

EPINEPHELUS NIGRITUS, Holbrook.—**BLACK GROUPEE**.—Coast of Florida.

21329. Cast. Pensacola, Fla. Silas Stearns.

PROMICROPS GUASA, (Poey) Gill.—**JEW FISH**; **GUASA**.—West Indian Fauna.

25101. Cast. St. John's River, Fla. Middleton, Carman & Co., N. Y. Weight of fish, 700 pounds.

CENTROPRISTIS ATRARIUS, (Linn.) Barn.—**SEA BASS**.—Cape Cod to Florida.

15684. Cast. (Male.) Noank, Conn. U. S. Fish Commission. August, 1874.
Photograph. U. S. Fish Commission.
Color sketches. (Richard.) U. S. Fish Commission.

"The Sea Bass, or Southern Black-fish." Lithograph in water colors. Illustration for Kilbourne & Goode's "Game Fishes of the United States." Exhibited by Charles Scribner's Sons, New York.

DIPLECTRUM FASCICULARE, (Cuv. & Val.) Holb.—**SQUIRREL**.—Cape Hatteras to Florida; West Indian Fauna.

Photograph. U. S. Fish Commission.
Photo-engraving.

LABRACIDÆ.

ROCCUS LINEATUS, (Schn.) Gill.—**STRIPED BASS**; **ROCK-FISH**.—St. Lawrence to Florida.

Cast. Potomac River. U. S. Fish Commission.

"The Striped Bass, or Rock-fish." Lithograph in water colors. Illustration from Kilbourne & Goode's "Game Fishes of the United States." Exhibited by Charles Scribner's Sons, New York.

ROCCUS CHRYSOPS, (Raf.) Gill.—**WHITE BASS**.—Great Lakes and Mississippi Valley.

15807. Cast. New York Market. E. G. Blackford. Oct. 7, 1875.
Photograph. U. S. Fish Commission.
Photo-engraving.

MORONE AMERICANA, (Gmel.) Gill.—WHITE PERCH.—Nova Scotia to Florida.

Photograph. U. S. Fish Commission.
Photo-engraving.

EPHIPPIIDÆ.**PAREPHIPPUS QUADRATUS, (Gun.) Gill.—MOON-FISH.—Cape Cod to Florida; West Indian Fauna.**

14886. Cast. Norfolk, Va. U. S. Fish Commission. July, 1873.
Photograph. U. S. Fish Commission.

LOBOTIDÆ.**LOBOTES SURINAMENSIS, Cuv.—TRIPLE-TAIL; FLASHER.—Cape Cod to Florida; West and East Indies.**

16202. Cast. New York market. E. G. Blackford. July 20. 1875.
Photograph. U. S. Fish Commission.

POMATOMIDÆ.**POMATOMUS SALTATRIX, (Linn.) Gill.—BLUE-FISH.—Pelagic.**

15871. Cast. Wood's Holl, Mass. V. N. Edwards. June 11, 1873.
Photograph. U. S. Fish Commission.
Color sketches. (Richard.) U. S. Fish Commission.
"The Blue Fish." Lithograph in water colors. Illustration from Kilbourne & Goode's "Game Fishes of the United States." Exhibited by Charles Scribner's Sons, New York.

ELACATIDÆ.**ELACATE CANADUS, (Linn.) Gill.—COBIA; CRAB-EATER.—Cape Cod to West Indies.**

Photograph. U. S. Fish Commission.

PRIACANTHIDÆ.**PSEUDOPRIACANTHUS ALTUS, (Gill) Bleeker.—SHORT BIG-EYE.—Cape Cod to Cape Hatteras.**

Photograph. U. S. Fish Commission.

ECHENEIDIDÆ.**LEPTECHENEIS NAUCRATEOIDES, (Zuiew.) Gill.—REMORA; SUCKER-FISH.—Coast generally.**

Photograph. U. S. Fish Commission.

RHOMBOCHIRUS OSTEOCHIR, (Cuv.) Gill.—SPEAR-FISH SUCKER.—Parasite of the Bill-fish (*Tetrapturus albidus*).

Photograph. U. S. Fish Commission.
Color sketches. (Richard.) U. S. Fish Commission.

SPHYRÆNIDÆ.

SPHYRÆNA BOREALIS, De Kay.—**NORTHERN BARRACUDA**.—Cape Cod to Florida.

Photograph. U. S. Fish Commission.
Photo-engraving.

SPHYRÆNA SPET, (Hany) Goode.

Color sketch. Col. H. M. Drummond-Hay.

PERCESOCES.**MUGILIDÆ.**

MUGIL ALBULA, Linn.—**MULLET**.—Cape Cod to Florida.

15723. Cast. New York market, E. G. Blackford.
Photograph. U. S. Fish Commission.

ATHERINIDÆ.

CHIROSTOMA NOTATUM, (Mitch.) Gill.—**SILVER-SIDES; FRIAR**.—Maine to Florida.

Photograph. U. S. Fish Commission.

HEMIBRANCHII.**GASTEROSTEIDÆ.**

PYGOSTEUS OCCIDENTALIS, (Cuv. & Val.) Brevoort.—**TEN-SPINED STICKLE-BACK**.—Newfoundland to Cape Hatteras.

Photograph. U. S. Fish Commission.

APELTES QUADRACUS, (Mitch.) Brev.—**FOUR-SPINED STICKLE-BACK**.—New Brunswick to Florida.

Photograph. U. S. Fish Commission.

AULOSTOMIDÆ.

AULOSTOMA MACULATUM, Val.—**TRUMPET-FISH**.—West Indian Fauna.

Color sketch. Col. H. M. Drummond-Hay.

SYNENTOGNATHI.**BELONIDÆ.**

BELONE LONGIROSTRIS, (Mitch.) Gill.—**SILVER GAR-FISH**.—Cape Cod to Florida.

Photograph. U. S. Fish Commission.

BELONE LATIMANUS, Poey.—**SILVER GAR-FISH**.—Cape Cod to Florida.

Photograph. U. S. Fish Commission.

BELONE HIANS, Cuv. & Val.—**BOW-MOUTHED GAR-FISH**.—West Indian Fauna.

Color sketch. (Richard.) U. S. Fish Commission.

SCOMBERESOCIDÆ.

EXOCÆTUS EXILIENS, Gmel.—**BUTTERFLY FLYING-FISH**.—West Indian Fauna and north to Cape Cod.

Color sketch. Col. H. M. Drummond-Hay.

CYPSELURUS FURCATUS, (Mitch.) Weinland.—**BEARDED FLYING-FISH**.—Atlantic.

Color sketch. Col. H. M. Drummond-Hay.

SCOMBERESOX SCUTELLATUS, Les.—**HALF-BEAK; SKIPPER**.—Nova Scotia to Florida.

Color sketches. (Richard.) U. S. Fish Commission.

HAPLOMI.

ESOCIDÆ.

ESOX AMERICANUS, Gmelin.—**BROOK PICKEREL**.—Massachusetts to Maryland.

Color sketch. (Richard.) U. S. Fish Commission.

Photograph. U. S. Fish Commission.

Photo-engraving.

ESOX RETICULATUS, Lesueur.—**PICKEREL**.—Atlantic slope, New England to Alabama.

15012. Cast. Washington, D. C. G. Brown Goode.

Photograph. U. S. Fish Commission.

Color sketch. U. S. Fish Commission.

Color sketch. (Roetter.) East Wareham, Mass. Museum of Comp. Zoology. Feb., 1869.

ESOX LUCIUS, Linn.—**PIKE**.—Northern America, Asia, and Europe.

14875. Cast. Sandusky, Ohio. J. W. Milner. Nov. 3., 1873.

Photograph. U. S. Fish Commission.

ESOX NOBILIOR, Thompson.—**MUSKALONGE** (weight 37 pounds).—Great Lakes and Southern British Provinces east of Rocky Mountains.

14895. Cast. Sandusky, Ohio. J. W. Milner. Oct., 1873.

Photograph. U. S. Fish Commission.

Color sketch. (Roetter.) Prof. A. Agassiz.

UMBRIDÆ.**DALLIA PECTORALIS**, Bean. Alaska.

Photo-engraving.

CYPRINODONTIDÆ.**HYDRARGYRA MAJALIS**, (Walb.) Val.—**MAY-FISH.** Brackish waters; Cape Ann to Cape Hatteras.

Photograph. U. S. Fish Commission.

ISOSPONDYLI.**CHAULIODONTIDÆ.****CHAULIODUS SLOANEI**, Schneider. North Atlantic.

Photo-engraving.

STOMIATIDÆ.**ECHIOSTOMA BARBATUM**, Lowe. North Atlantic.

Photo-engraving.

STOMIAS FEROX, Reinhardt. North Atlantic.

Photo-engraving.

SYNODONTIDÆ.**TRACHINOCEPHALUS MYOPS**, (Schn.) Gill. Cape Hatteras to Florida.

Photo-engraving.

MICROSTOMIDÆ.**OSMERUS MORDAX**, (Mitch.) Gill.—**SMELT; FROST-FISH.**—Nova Scotia to Cape Hatteras.

15808. Cast. Maine. U. S. Fish Commission.

Photograph. U. S. Fish Commission.

Photo-engraving.

ARGENTINA SYRTENSIIUM, Goode & Bean.—**WESTERN ARGENTINE.**—Deep-sea Fauna of Western Atlantic.

Photo-engraving.

COREGONIDÆ.**COREGONUS CLUPEIFORMIS**, (Mitch.) Milner.—**WHITE-FISH.**—Great Lakes and British America.

16741. Cast. Michigan. U. S. Fish Commission.

Photograph. U. S. Fish Commission.

COREGONUS LABRADORICUS, Rich.—LAKE WHITING.—Northern Lakes.

Photograph. U. S. Fish Commission.

**PROSOPIUM QUADRILATERALE, (Rich.) Milner.—“SHAD-WAITER.”
—Great Lakes and northward.**

Photograph. U. S. Fish Commission.

**PROSOPIUM COUESII, Milner.—CHIEF MOUNTAIN LAKE WHITE
FISH.—Upper Missouri Region.****ARGYRO SOMUS ARTEDI, (Les.) Hoy.—HEBBING WHITE-FISH.—
Great Lakes, etc.**

Photograph. U. S. Fish Commission.

Photo-engraving.

SALMONIDÆ.**SALMO SALAR, Linn.—SALMON.—North America and Europe.**

Cast. (Delaware River.) U. S. Fish Commission.

Photograph. U. S. Fish Commission.

415. Water-color sketch. U. S. Fish Commission.

Photo-engraving.

“The Atlantic Salmon.” Lithograph in water colors. Illustration from Kilbourne & Goode’s “Game Fishes of the United States.” Exhibited by Charles Scribner’s Sons, New York.

Oil painting—“A salmon from the York River, Gaspé, Lower Canada.” Exhibited by Walter M. Brackett, Boston. The scene in the background is on the York River.

**SALMO SALAR, *subsp.* SEBAGO, Girard.—SEBAGO SALMON (land-
locked)—St. Croix River and Sebago Lake. Introduced
into other lakes.**

15977. Cast. Sebago Lake, Me. J. R. Dillingham.

15978. Cast. Sebago Lake, Me. J. R. Dillingham.

Color sketches. (Richard.) U. S. Fish Commission.

SALMO KENNERLYI, Suckley.—RED SALMON.—Pacific Coast.

Photo-engraving.

**SALMO QUINNAT, Richardson.—QUINNAT or SACRAMENTO SALMON.
—Northwest Coast of America; south to California.**

Photograph. U. S. Fish Commission.

Color sketch. (Richard.) U. S. Fish Commission.

Photo-engraving.

**SALVELINUS NAMAYCUSH, (Penn.) Goode.—NAMAYCUSH TROUT;
LAKE TROUT.—Northern Lakes.**

10312. Cast. Moosehead Lake, Me. E. M. Stillwell.

15925. Cast.

Color sketches. (Richard.) U. S. Fish Commission.

Photograph. U. S. Fish Commission.

SALVELINUS FONTINALIS, (Mitch.) Gill & Jordan.—**BROOK TROUT**.—Rivers and Lakes of British North America and of the northern parts of the United States and Appalachian Range.

15958. Cast. Bay City, Mich. U. S. Fish Commission.

15470. Cast. Sysladobsis Lake, Me. "Dobsis Club," through Judge Harvey Jewell. June, 1875.

Photograph. U. S. Fish Commission.

"The Eastern Red-speckled Trout." Lithograph in water colors. Illustration from Kilbourne & Goode's "Game Fishes of the United States," Charles Scribner's Sons, New York.

SALVELINUS OQUASSA, (Girard) Gill & Jordan.—**OQUASSA TROUT**.—Rangely Lake, Me., and vicinity.

Photograph. U. S. Fish Commission.

THYMALLUS TRICOLOR, Cope.—**MICHIGAN GRAYLING**.—Northern portion southern peninsula of Michigan.

15226. Cast. Au Sable River, Mich. Fred. Mather. April 7, 1875.

Photograph. U. S. Fish Commission.

ALEPIDOSAURIDÆ.

ALEPIDOSAURUS FEROX, Lowe.—**LANCET-MOUTH**.—North Atlantic.

Photo-engraving.

ALEPOCEPHALIDÆ.

ALEPOCEPHALUS BAIRDII, Goode & Bean.—North Atlantic coast.

Photo-engraving.

ALBULIDÆ.

ALBULA VULPES, (Linn.) Goode.—**LADY-FISH**.—Pelagic; Tropical and Subtropical Seas.

Photograph. U. S. Fish Commission.

Photo-engraving.

HYODONTIDÆ.

HYODON TERGISUS, Les.—**MOON-EYE**.—Great Lakes and Mississippi Valley.

Photograph. U. S. Fish Commission.

ELOPIDÆ.

ELOPS SAURUS, Linn.—**BIG-EYED HERRING**.—Tropical and Subtropical Seas.

Photograph. U. S. Fish Commission.

MEGALOPS THRISSOIDES, (Schn.) Günther.—**TARPUM**.—Cape Cod to Florida.

Photograph. Newport, R. I. S. Powell. Aug., 1874.

CLUPEIDÆ.

BREVOORTIA TYRANNUS, (Latr.) Goode.—**MENHADEN**; **MOSS-BUNKER**; **POGIE**.—Newfoundland to Gulf of Mexico.
 Cast. Coast of Maine. U. S. Fish Commission.
 Photograph. U. S. Fish Commission.
 Color sketch. Prof. Alex. Agassiz.

BREVOORTIA PATRONUS, Goode.—**GULF MENHADEN**.—Gulf of Mexico.
 Alcoholic. Pensacola, Fla. S. Stearns.

ALOSA SAPIDISSIMA, (Wilson) Storer.—**SHAD**.—Newfoundland to Florida.
 Cast. Potomac River. U. S. Fish Commission.
 Photograph. U. S. Fish Commission.

POMOLOBUS VERNALIS, (Mitchill) Goode and Bean.—**ALEWIFE**; **GASPEREAU**.—Newfoundland to Florida.
 Photograph.
 Photo-engraving.

POMOLOBUS ÆSTIVALIS, (Mitchill) Goode and Bean.—**SUMMER OR GLUT**; **ALEWIFE**.
 Photograph. U. S. Fish Commission.
 Photo-engraving.

POMOLOBUS MEDIOCRIS, (Mitch.) Gill.—**MATTOWACCA**; **TAILOR HERRING**; **SEA SHAD**.—Newfoundland to Florida.
 Photograph. U. S. Fish Commission.

CLUPEA HARENGUS, Linn.—**HERRING**; **SEA HERRING**.—North Atlantic.
 Photograph. U. S. Fish Commission.

DOROSOMIDÆ.

DORYSOMA CEPEDIANUM (Lac.), Gill.—**MUD SHAD**; **WINTER SHAD**.—Cape Cod to St. John's River, Fla.
 15695. Cast. Washington market. G. Brown Goode. Dec., 1874.
 Photograph. U. S. Fish Commission.

ENGRAULIDIDÆ.

ENGRAULIS VITTATA, (Mitch.) B. & G.—**ANCHOVY**.—Cape Cod to Cape Hatteras.
 Photo-engraving.

EVENTOGNATHI.

CATOSTOMIDÆ.

CATOSTOMUS TERES, (Mitchill) Les.—COMMON SUCKER.—Eastern Northern America.

Photograph. U. S. Fish Commission.

MYXOSTOMA MACROLEPIDOTUM, (Les.) Jordan.—STRIPED SUCKER.—Mississippi Valley and Great Lakes.

Photograph. U. S. Fish Commission.

CYCLEPTUS ELONGATUS, (Les.) Ag.—BLACK SUCKER.—Mississippi Valley.

Photograph. U. S. Fish Commission.

ERIMYZON SUCETTA, (Lac.) Jordan.—CHUB SUCKER.—Eastern United States.

Photograph. U. S. Fish Commission.

BUBALICHTHYS URUS, Ag.—BUFFALO CARP.—Mississippi Valley.

23558. Cast. Madison, Ind. George Spangler. Weight, 49 pounds.

CARPIODES CYPRINUS, (Les.) Ag.—AMERICAN CARP.—Eastern United States.

16780. Cast. Sandusky, Ohio. J. W. Milner. Nov. 3, 1875.

CYPRINIDÆ.

PTYCHOCHEILUS GRANDIS, (Ayres) Girard.—“PIKE.”—Pacific Slope.

Photograph. U. S. Fish Commission.

NOTEMIGONUS CHRYSOLEUCUS, (Mitch.) Jordan.—SHINER.—Eastern Atlantic States.

Color sketch. (Richard.) U. S. Fish Commission.

LEUCISCUS PULCHELLUS, Storer.

Color sketch. (Burkhardt.) New Bedford, Mass. Prof. Alex. Agassiz. 1861.

ORDER NEMATOGNATHI.

SILURIDÆ.

AMIURUS CATUS, (Linn.) Gill.—HORN POUT.—Eastern North America.

Color sketch. Prof. Alex. Agassiz. Natural size drawing by P. Roetter from a fresh specimen, East Wareham, Mass., Feb., 1869; weight, 1½ lbs. “S. T. Tisdale says he has seen the young of this species following the mother like a brood of chickens.”—*MS. note.*

ICHTHÆLURUS FURCATUS, (C. & V.) Gill.—CHANNEL CAT-FISH.—Mississippi Valley.

15787. Cast. Carrollton, Ky. J. W. Milner. Nov. 5, 1873.

AMIURUS PONDEROSUS, Bean.23388. Cast. St. Louis, Mo. J. G. W. Steedman.
Weight. 150 pounds.**ORDER APODES.****CONGRIDÆ.****CONGER OCEANICA, (Mitch.) Gill.—CONGER EEL.—Newfoundland to West Indies.**

Photograph. U. S. Fish Commission.

ANGUILLIDÆ.**ANGUILLA VULGARIS, Turton.—COMMON EEL.—Eastern United States.**

15731. Cast. New York. E. G. Blackford. Aug. 26, 1874.

Photograph. U. S. Fish Commission.

Color sketches. (Richard.) U. S. Fish Commission.

NEMICHTHYIDÆ.**NEMICHTHYS SCOLOPACEUS Rich.—SNIPE EEL.—Deep waters of the Atlantic.**

Photo-engraving.

SYNAPHORANCHIDÆ.**SYNAPHORANCHUS PINNATUS, (Gronow) Günther.—MADEIRA EEL.—Deep waters of the Atlantic.**

Photo-engraving.

SIMENCHELYIDÆ.**SIMENCHELYS PARASITICUS, Gill.—PUG-NOSED EEL.—North Atlantic Coast.**

Photo-engraving.

ORDER CYCLOGANOIDEI.**AMIIDÆ.****AMIA CALVA, Linn.—MUD-FISH.—Central and Southeastern United States.**

Photograph. U. S. Fish Commission.

ORDER RHOMBOGANOIDEI.

LEPIDOSTEIDÆ.

LEPIDOSTEUS OSSEUS, Linn.—GAR PIKE.—Mississippi Valley and Atlantic States south of Delaware River.

15366. Cast. Potomac River. J. W. Milner.
Photograph. U. S. Fish Commission.

LEPIDOSTEUS PLATYSTOMUS, Raf.—SHORT-NOSED GAR PIKE.—Great Lakes and streams south and west to the Rocky Mountains.

Photo-engraving.

ORDER SELACHOSTOMI.

POLYODONTIDÆ.

POLYODON FOLIUM, Lac.—PADDLE-FISH.—Fresh waters of Mississippi Valley.

Photograph. U. S. Fish Commission.
Photo-engraving.

ORDER CHONDROSTEI.

ACIPENSERIDÆ.

ACIPENSER STURIO, Linn.—SHARP-NOSED STURGEON.—North Atlantic; ascending rivers.

14877. Potomac River. J. W. Milner.
Photograph. U. S. Fish Commission.

ACIPENSER BREVIROSTRIS, Les.—SHORT-NOSED STURGEON.—Atlantic Coast of United States.

Photograph. U. S. Fish Commission.

ACIPENSER RUBICUNDUS, Les.—LAKE STURGEON.—Great Lakes and south.

Photograph. U. S. Fish Commission.

SCAPHYRRHYNCHOPS PLATYRRHYNCHUS, (Raf.) Gill.—SHOVEL-NOSED STURGEON.—Mississippi Valley.

Photograph. U. S. Fish Commission.

VI. ELASMOBRANCHIATES.

ORDER HOLOCEPHALI.

CHIMÆRIDÆ.

CHIMÆRA PLUMBEA, Gill.—**BROWN CHIMÆRA**.—Deep waters of Western Atlantic.

Photo-engraving.
Color sketch.

ORDER RAIÆ.

MYLIOBATIDÆ.

MYLIOBATIS FREMENVILLEI, (Les.) Storer.—**EAGLE RAY**.—Cape Cod to Florida.

16603. Cast. Wood's Holl, Mass. U. S. Fish Commission. Sept. 23, 1875.
Photograph. U. S. Fish Commission.
Color sketch. (Richard.) U. S. Fish Commission.

MYLIOBATIS CALIFORNICUS, Gill.—**CALIFORNIA STING RAY**.—Coast of California.

Photograph. U. S. Fish Commission.

BHINOPTERA QUADRILOBA, (Les.) Cuv.—**COW-NOSED RAY**.—Cape Cod to Florida.

Photograph. U. S. Fish Commission.

ÆTOBATIS NARINARI, (Euphr.) M. & H.

Color sketch. Col. H. W. Drummond-Hay.

TRYGONIDÆ.

TRYGON CENTRURA, (Mitch.) Gill.—**STING RAY**.—Cape Cod to Florida.

Photograph. U. S. Fish Commission.

PTEROPLATEA MACLURA, Mull. & Henle.—**BUTTERFLY RAY**.—Cape Cod to Florida.

Photograph. U. S. Fish Commission.

TORPEDINIDÆ.

TORPEDO OCCIDENTALIS, Storer.—**TORPEDO; CRAMP-FISH**.—Cape Cod to Florida.

Photograph. U. S. Fish Commission.

RAIIDÆ.

RAIA ERINACEA, Mitchill.—CLEAR-NOSED SKATE.—Nova Scotia to Florida.

Photograph. U. S. Fish Commission.
Color sketches. U. S. Fish Commission.
Color sketches. Prof. Alex. Agassiz.

RAIA OCELLATA, Mitchill.—SPOTTED SKATE.—New England Coast.

Color sketch. Richard. U. S. Fish Commission.
Photo-engraving.

RAIA GRANULATA, Gill.—North Atlantic Coast.

Photo-engraving.

RAIA LÆVIS, Mitch.—SHARP-NOSED SKATE.—Nova Scotia to Florida.

Photograph. U. S. Fish Commission.

RHINOBATIDÆ.

RHINOBATUS PRODUCTUS, Girard.—LONG-NOSED SKATE.—Coast of California.

Photograph. U. S. Fish Commission.

PRISTIDÆ.

PRISTIS ANTIQUORUM, (Linn.) Lath.—SAW-FISH.—Cape Cod to Florida; Tropical Seas.

12453. Stuffed skin. Florida. H. A. Ward.

SQUATINIDÆ.

SQUATINA DUMERILLI, Les.—MONK-FISH; FIDDLE-FISH.—Cape Cod to Florida; Temperate and Tropical Seas.

Photograph. U. S. Fish Commission.

ORDER SQUALI.**LAMNIDÆ.**

LAMNA CORNUBICA.—MACKEREL SHARK.—Newfoundland to Florida.

Color sketch. (Richard.) U. S. Fish Commission.

ODONTASPIDIDÆ.

CARCHARIAS LITTORALIS, (Mitchill.)—SAND SHARK.—Pelagic.

Photograph. U. S. Fish Commission.

ALOPECIDÆ.

ALOPIAS VULPES, (Linn.) Bon.—**THRESHER**; **SWINGLE-TAIL**.—Atlantic and Mediterranean.

15733. Cast. Wood's Holl, Mass. U. S. Fish Commission.

SPHYRNIDÆ.

SPHYRNA ZYGÆNA, (Linn.) Mull. & Henle.—**HAMMER-HEAD SHARK**.—Tropical and Subtropical Seas.

Color sketch. (Richard.) U. S. Fish Commission.

RENICEPS TIBURO, (Linn.) Gill.—**SHOVEL-HEAD SHARK**.—Atlantic and Western Pacific.

Color sketch.

GALEORHINIDÆ.

ISOGOMPHODON MACULIPINNIS, Poey.—**SPOTTED-FIN SHARK**.—Tropical and Subtropical Seas.

Color sketch. (Richard.) U. S. Fish Commission.

GALEOCERDO TIGRINUS, Mull & Henle.—**TIGER SHARK**.—Atlantic; Indian Ocean.

Photograph. U. S. Fish Commission.

MUSTELUS CANIS, (Mitch.) De Kay.—**SMOOTH DOG-FISH**.—Cape Cod to Cape Hatteras.

Photograph. U. S. Fish Commission.

GINGLYMOSTOMATIDÆ.

GINGLYMOSTOMA CIRRATUM, (Gmel.) M. & H.—**NURSE-SHARK**.—Tropical Atlantic.

Color sketch.

SPINACIDÆ.

SQUALUS AMERICANUS, (Storer) Gill.—**SPINED DOG-FISH**.—Newfoundland to Cape Hatteras.

Photograph. U. S. Fish Commission.

SCYMNIDÆ.

SOMNIOSUS MICROCEPHALUS, (Bloch.) Gill.—**SLEEPER SHARK**.—North Atlantic.

Photograph. U. S. Fish Commission.

VII. MARSIPOBRANCHIATES.

ORDER, HYPEROARTIA.

PETROMYZONTIDÆ.

PETROMYZON AMERICANUS.—LAMPREY EEL.

Color sketches. (Richard.) U. S. Fish Commission.

INVERTEBRATES.

I. MOLLUSKS.

NOTE.—As a matter of convenience all invertebrates, except OYSTERS, are arranged in Section E of this catalogue. The collections of economic invertebrates were prepared by Mr. William H. Dall for the International Exhibition of 1876 in Philadelphia, and the arrangement is that proposed by him.

ORDER, ACEPHALA.

OSTREA VIRGINICA, Gmelin.—EAST AMERICAN OYSTERS.

1. Series illustrating geographical distribution.

32784. Northern variety (*O. borealis*, Lam.) Prince Edward's Island. J. W. Dawson.
32813. Nova Scotia. J. H. Willis.
32785. Shediac, New Brunswick. W. H. Dall.
33092. "Pourrier Bed." Shediac, New Brunswick. G. F. Mathew.
33093. "Buctouche." Kent County, New Brunswick. G. F. Mathew.
32783. Miramichi River, New Brunswick. W. H. Dall.
32977. Indigenous oyster, now extinct. Shell-heaps. Damariscotta, Maine. Robert Dixon.
32978. Ditto. Shell-heaps. Sheepscot River, Maine. Robert Dixon.
32810. Indigenous oyster (var. *borealis*). Buzzard's Bay, Mass. Dr. Wm. Stimpson.
32814. Specimens showing color-bands. Rhode Island. General Totten.
- NOTE.—The following series of oysters from the vicinity of New York were furnished by Mr. B. J. M. Carley, oyster-dealer, of Fulton Market, New York, through Mr. E. G. Blackford:
32790. "Greenwich." Greenwich, Conn.
32777. "Blue Point." Long Island, New York.
32779. "Lloyd's Harbor." Long Island, New York.
32781. "Cow Bay." Long Island, New York.
32791. "Glenwood." Glenwood, Long Island, New York.
32812. "Cove." Long Island, New York.
32920. "City Island." Long Island Sound, New York.

FISHERIES OF THE UNITED STATES.

32919. "Mill Pond." Cow Bay, Long Island, New York.
 32772. "Shrewsbury." Shrewsbury River, New Jersey.
 32915. "Egg Island." Three years old. Morris Cove, Delaware.
 33782. "Chesapeake." Crisfield, Md. E. G. Blackford.
 32976. Pokanoke, Virginia. E. G. Blackford.

NOTE.—The following series from the waters of Virginia and Maryland, all indigenous or "natural growths" as distinguished from "plants," were selected by Mr. G. W. Harvey, and furnished by Harvey & Holden, oyster-dealers of Washington, D. C. :

33096. "St. Gerome River." Maryland.
 33097. "Deep Creek." Eastern shore of Maryland.
 33098. "Tangier Sound." Chesapeake Bay.
 33100. "Little River." Western shore of Maryland.
 33099. "Point Lookout Creek." Virginia.
 33101. "Naswaddox." Eastern shore of Virginia.
 33095. "Rappahannock." Rappahannock River, Virginia.
 33103. "York River." York River, Virginia.
 33104. "Cherrystones." Chesapeake Bay.
 33102. "Presby's Creek." Presby's Creek, Virginia.

The following series from Florida were furnished by Kossuth Niles, U. S. N. :

32805. "Appalachicola Bay." Appalachicola Bay, Florida.
 32806. "Cat Point." Same locality.
 32807. ———. Same locality.
 32808. "Raccoon oysters." Appalachicola Bay, Florida.

The following series from the vicinity of New Orleans were selected by M. Zatarain, and furnished by W. Alex. Gordon, esq., of New Orleans, La. :

32800. "Timbalier Bay." Louisiana.
 32801. "Southwest Pass." Louisiana.
 32802. "Bayou Cook." Louisiana.
 32803. "Four Bayous." Louisiana.
 32804. "Grand Lake." Louisiana.

2. Series illustrating culture and individual variations:

That portion of the series from South Norwalk, Conn., was furnished by Hoyt Bros. of that place, at the instance of James Richardson, esq. The portion of the series from the vicinity of New York was furnished by Mr. J. B. M. Carley through Mr. E. G. Blackford, of New York.

a. Growth. 1-20 years old:

32958. Young spat on various stools. South Norwalk, Conn.
 32957. One year old. South Norwalk, Conn.
 32967. Two to three years old. Natural growth. South Norwalk, Conn.
 32968. Three to four years old. Natural growth. South Norwalk, Conn.
 32965. "Cullers." Three to four years old. South Norwalk, Conn.
 32962. Three years after transplantation. South Norwalk, Conn.
 32964. "Box." Four to six years old. South Norwalk, Conn.
 32916. "Cullers." Three years old. Vicinity of New York.
 32918. "Single extra." Four years old. Vicinity of New York.
 32776. "Double extra." Vicinity of New York.
 32917. "Box." Three years old. Vicinity of New York.

b. Peculiarities of form and growth :

32959. "Pinched" oyster from muddy bottom. South Norwalk, Conn.
 32930. Showing the effect of transplanting the "pinched" from a muddy to a hard bottom. South Norwalk, Conn.
 32787. Form caused by growing in a tideway. Vicinity of New York.
 32786. Form caused by growing in still water. Vicinity of New York.
 32974. Curious forms of shell. South Norwalk, Conn.
 32782. Peculiar growth. Vicinity of New York.
 32795. Specimens of peculiar form. Vicinity of New York.
 32971. Natural growth on stone. South Norwalk, Conn.
 32973. Natural growth on part of stone jug. South Norwalk, Conn.
 32972. Natural growth on shells. South Norwalk, Conn.
 32970. Natural growth on bottle. South Norwalk, Conn.
 32969. Natural growth on crab. South Norwalk, Conn.
 32780. Illustrating methods of attachment. Vicinity of New York.
 32914. Blue Point "seed." Long Island, New York.
 32789. Rosette of oysters. Vicinity of New York.
 32792. Shell growing on *Maetra* shell. Vicinity of New York.
 32794. "Seed" on old rubber boot. Vicinity of New York.
 32793. "Seed" growing on stone. Vicinity of New York.
 32895. "Seed" on rubber shoe. Vicinity of New York.
 32894. "Seed" on bone. Vicinity of New York.
 32797. "Seed" on bark. Vicinity of New York.
 32796. "Seed" on leather shoe. Vicinity of New York.
 32932. "Seed" on old boot-leg. Vicinity of New York.

c. Enemies and parasites :

32927. Specimens injured by whelk. South Norwalk, Conn.
 32929. Specimens injured by hairy whelk. South Norwalk, Conn.
 32928. Specimens perforated by "drill." South Norwalk, Conn.
 32963a. Specimen injured by boring worm (an *Annelid*). South Norwalk, Conn.
 32956. Specimens killed by star-fish. South Norwalk, Conn.
 32963. Specimens showing ravages of *Cliona* or boring sponge. South Norwalk, Conn.
 For commensal crab, see Crustacea.
 33092a. Lime derived from oyster shells. Use in medicine and as a fertilizer. Washington, D. C. W. H. Dall.

SERIES OF ILLUSTRATIONS OF THE EMBRYOLOGY OF THE AMERICAN OYSTER, PREPARED FOR THE MARYLAND FISH COMMISSION BY DR. W. K. BROOKS, PH. D., OF JOHNS HOPKINS UNIVERSITY, BALTIMORE.

EXPLANATION OF THE FIGURES.

Unless the contrary is stated, the figures are drawn with a magnifying power of 250 diameters; Zeiss. F. 2, but it was necessary to amplify the sketches considerably in order to reproduce, by the process of photo-engraving, the features which this magnifying power rendered visible, and the figures as they are reproduced are of about twice the diameter of camera sketches made with the same magnifying power.

The first thirty-two figures show the process of segmentation. Figure 1 is an egg at the end of the first period of rest; Figures 2, 3, 4, 5, 6, and 7, the changes during the first period of activity;

Figures 8, 9, 10, 11, 12, and 13, the changes during the second period of rest; Figures 14, 15, and 16, those which take place during the second period of activity; 17, 18, and 19, those which take place during the third period of rest; 20 and 21, during the third period of activity; 22, during the fourth period of activity; 23, during the fifth period of activity, and the remaining figures show more widely separated stages. In all the figures of segmentation, except 29, 30, and 31, the formative pole is above and the nutritive pole below.

Figure 1.—Eggs two hours and seven minutes after fertilization. It is now perfectly spherical, with an external membrane, and the germinative vesicle is not visible.

Figure 2.—The same egg two minutes later. It is now elongated; one end is wider than the other, and a transparent area at the broad end marks the point where the polar globules are about to appear. At the opposite end the external membrane is wrinkled by waves which run from the nutritive towards the formative pole in rapid succession for about fifteen seconds.

Figure 3.—The same egg two minutes later.

Figure 4.—The same egg two minutes later. The yolk has become pear-shaped. The polar globule has appeared at the formative pole, in the middle of the broad end of the pear, and the nutritive end of the egg is now less granular than the formative end.

Figure 5.—The same egg two minutes later. Three equidistant furrows have made their appearance, separating it into a single mass at the nutritive pole, and two at the formative pole. At this stage the three masses are about equal in size.

Figure 6.—The same egg two minutes later. The first micromere, *c*, is now perfectly separated, and smaller than the second, *b*, and each is smaller than the macromere, *a*.

Figure 7.—The same egg one minute later. Both micromeres are separated and are spherical, as is also the macromere. This stage ends the first period of activity.

Figure 8.—The same egg forty-five seconds later. The two micromeres have begun to fuse with each other, and the second micromere, *b*, is also partially fused with the macromere, *a*.

Figure 9.—The same egg one minute later. The first micromere, *c*, has also begun to unite with the macromere.

Figure 10.—The same egg one minute later. The line between the second micromere and macromere has disappeared, and the first micromere, *c*, now projects from one end of the elongated mass formed by the union of the spherules *a* and *b*.

Figure 11.—The same egg three minutes later. The fusion of *a* and *b* is now complete, and a large transparent vesicle is now visible in the first micromere, *c*, and another in the compound mass, *ab*.

Figure 12.—The same egg two minutes and thirty seconds later.

Figure 13.—Another egg, about two minutes later. This is the true resting stage, at the end of the second period of rest. The two vesicles have become irregular. The remains of an external membrane adhere to one side of the egg.

Figure 14.—The same egg seven minutes later than Figure 13. The compound mass, *a* and *b*, is elongated, the first micromere, *c*, is well defined, and waves travel from the nutritive towards the formative ends of the two masses. Two segmentation nuclei oc-

copy the positions of the large vesicles of earlier stages. This stage is the beginning of the second period of activity.

Figure 15.—The same egg one minute later. The second micromere, *b*, is now well defined, as well as the first.

Figure 16.—The same egg one minute later. This stage marks the end of the second period of activity. The formative end of the egg is now occupied by four micromeres, two of which seem to be the products of the division of the first micromere, *c*, and two of them the products of the second, *b*.

Figure 17.—The same egg two minutes later, at the commencement of the third period of rest. The second micromere, *b*, has again begun to fuse with the macromere, *a*.

Figure 18.—The same egg three minutes and thirty seconds later. The second micromere is no longer separated from the macromere, and mass, *a* and *b*, formed by their union is nearly spherical.

Figure 19.—The same egg two minutes and a half later, at the end of the third period of rest, viewed at right angles to Figure 18.

Figure 20.—The same egg thirteen minutes later, and in the same position as Figure 18. The spherule, *c*, of figure 19 has divided into two, and the second micromere, *b*, has become prominent, so that there are five micromeres at the formative pole.

Figure 21.—The same egg one minute later, and in the same position as figure 19.

Figure 22.—The same egg in the position of figure 20, fifteen minutes later than figure 21, and in the fourth period of activity. There are now seven micromeres at the formative pole, six on one side of the polar globules and one, the second micromere, *b*, on the other.

Figure 23.—The same egg twenty-one minutes later, viewed from the side opposite the second micromere. The cells which have been formed by the division of the micromeres of the stage 19 now form a layer, the ectoderm, which rests, like a cap, on the macromere, *a*.

Figure 24.—The same egg five hours and fifteen minutes later, in the same position as figure 22, but not quite as much magnified. On one side the polar globule is still separated from the macromere, *a*, by a single spherule—the second micromere, *b*. Opposite this the growing edge, *g*, of the ectoderm is spreading still farther down over the macromere. At the point *g*, and at four other points, are pairs of small cells, which have evidently been formed by the division of the larger spherules.

Figure 25.—Another egg at about the same stage.

Figure 26.—The egg shown in figure 24, fifty-five minutes later. The macromere, *a*, is almost covered by the ectoderm, and the second micromere, *b*, has divided into a number of spherules. At the growing edge, *g*, an ectoderm spherule is seen separating from the macromere.

Figure 27.—A similar view of an egg twenty-seven hours after impregnation. The macromere is almost covered by the ectoderm, *ec*, and is not visible in a side surface view. At *g* is an ectoderm spherule, which is separating from the macromere.

Figure 28.—Optical section of the same egg; *ec*, ectoderm; *ca*, macromere, divided into two spherules. No segmentation cavity can be seen in a normal egg at this or any of the preceding stages.

Figure 29.—View of the nutritive pole of an egg a few hours older.

Figure 30.—View of the formative pole of a still older egg.

Figure 31.—Optical vertical section of a somewhat older egg, figured with the polar globule above and the ectoderm to the right. The egg is now flattened from above downwards, and is disk-shaped in a surface view. The macromere has given rise to a layer of larger granular cells, which are pushed in so as to form a large cup-shaped depression. The more transparent ectoderm, *ec*, now carries a few short cilia scattered irregularly, and the two layers are separated from each other by a segmentation cavity. This figure is in plate III.

Figure 32.—Surface view, and

Figure 33.—Optical section of the embryo at the first swimming stage. The ectoderm has folded upon the endoderm, so as to form a primitive digestive cavity, with an external opening, *g*. The cilia of the velum have now made their appearance around the area occupied by the polar globule. This was not present in the egg from which the figure was drawn, but it was seen in other eggs, and is shown in a later stage of another embryo, figure 6.

Figure 34 and figure 35.—Two surface views of the embryo shown in figure 32.

Figure 36.—An older embryo, in the same position as figures 32 and 33. The external opening of the primitive digestive tract has closed up, and the two valves of the shell have appeared in the place which it had occupied. The endoderm has no connection with the exterior, and no central cavity could be seen.

Figure 37.—A somewhat older embryo, figured with its dorsal surface above. There is a large, central, ciliated digestive cavity which opens externally by the mouth, *m*, which is almost directly opposite the primitive opening, the position of which is shown by the shell, *s*.

Figure 38.—A similar view of a still older embryo. The shell, *s*, has increased in size, and the digestive tract has two openings, the mouth, *m*, and the anus, *an*, which are very near each other on the ventral surface.

Figure 39.—The opposite side of a still older embryo, in which the body wall begins to fold under the shell, to form the mantle, *m*.

Figure 40.—Dorsal view of an embryo at about the same stage.

Figure 41.—Dorsal view of an embryo at the stage shown in Figure 38, with its valves extended; *rs*, right valve of shell; *ls*, left valve of shell; *an*, anus; *a*, anal papilla; *ma*, mantle; *v*, velum; *b*, body cavity; *st*, stomach.

Figure 42.—View of left side of a still older embryo; *i*, intestine. Other letters as in Figure 41.

Figure 43.—Dorsal view of an embryo six days old, swimming by the cilia of its velum.

Figure 44.—View of right side of another embryo at the same stage; *mu*, muscles; *l*, liver. Other letters as in Figure 41.

Figure 48.—The seminal fluid of a ripe male oyster, mixed with water, and seen with a power of 80 diameters. Zeiss. a. 2.

Figure 49.—Fluid from the ovary of a ripe female oyster, seen with the same magnifying power.

Figure 50.—Seminal fluid of a ripe male oyster, magnified 500 diameters.

Figure 51.—Egg a few minutes after mixture with the male fluid magnified 500 diameters.

Figure 52.—Egg about thirty minutes after fertilization magnified 500 diameters.

Figure 67.—Section of a portion of the visceral mass of a male oyster magnified 250 diameters. The surface epithelium of the body is shown at the lower end of the figure. Above this is a loose, thick layer of wrinkled cells, which have the appearance of adipose cells from which all the fat has been removed. Above this layer is a large duct, lined with epithelial cells, and filled with ripe spermatozoa, which have been poured into it from two follicles which communicate with it on each side. Above these are sections of a number of the follicles of the testis, in three of which the contents are figured.

Figure 53.—Section of a portion of the viscera mass of a female oyster magnified 250 diameters; *a*, epithelium of the surface of the body; *b*, layer of connective tissue; *c*, layer of wrinkled cells, which are probably fat cells, from which all the fat has been removed; *f*, sections of ten ovarian follicles; *e*, the ovarian eggs.

Figures 54-66.—Abnormal or direct form of segmentation.

OSTREA LURIDA, Cpr.—WEST COAST OYSTERS.

32879. Natives. Crescent City, Cal. W. H. Dall.
 32809. Natives. Shoalwater Bay, W. T. H. Hemphill.
 32798. Natives. San Diego, Cal. H. Hemphill.
 32798. Eastern oyster (*O. virginica*). Taken from Newark Bay, N. J., when a year old and planted in San Francisco Bay; showing two years' growth in California waters.

Extra-limital:

32878. Fossil oyster from marine Tertiary beds near Vicksburg, Miss. Closely resembling the present English oyster.
 32311. Fresh specimen, English oyster (*O. edulis*, Linn.). Introduced for comparison with the American fossil and recent oysters. North Sea. Dr. Wm. Stimpson.

MARINE PLANTS.

I. ALGÆ.

39126. Three portfolios of Algae of North America, prepared by Prof. D. C. Eaton, Dr. C. L. Anderson, and Dr. W. G. Farlow.

SECTION B.

FISHING GROUNDS OF NORTH AMERICA.

I. MODELS AND MAPS OF FISHING GROUNDS.

Relief model of the off-shore banks of the United States, showing the contours to a depth of 2,800 fathoms.

Prepared for the U. S. Fish Commission by Mr. C. Lindenkohl.

(See also the maps and charts exhibited elsewhere in the collection.)

II. MAPS SHOWING GEOGRAPHICAL DISTRIBUTION.

Prepared by G. Brown Goode, drawn by C. E. Gorham.

- No. 1. Provisional map showing Geographical Distribution of the fishes of the Salmon Family in the Eastern United States.
- No. 2. Provisional map showing the geographical distribution of the cod (*Gadus morrhua*), and the locations of the fishing grounds and fishing ports.
- No. 3. Provisional map showing the geographical distribution of the Halibut, (*Hippoglossus vulgaris*), on the coast of North America and the principal fishing grounds in 1879.
- No. 4. Provisional map showing the geographical distribution of the Mackerel (*Scomber scombrus*), its seasonal movements, and the fishing grounds and fishing ports.
- No. 5. Map showing the geographical distribution of the Menhaden (*Brevoortia tyrannus*) in 1879, with the location of the fishing grounds and the oil and guano factories.
- No. 6. Provisional map showing the Geographical Distribution of the fishes of the Herring family in Eastern North America.
- No. 7. Provisional map showing the Geographical Range of the principal fishes of the Mackerel tribe (*Scombridae* and *Carangidae*) in Eastern North America.
- No. 8. Map showing the distribution of the oyster beds on the coast of New England and Nova Scotia, from data furnished by Mr. Ernest Ingersoll.
- No. 9. Map showing the distribution of the oyster beds of Maryland. From the explorations of the United States Coast Survey.
- No. 10. Map showing the obstructions to the ascent of fish in the rivers of Maine. 1876. Compiled by C. G. Atkins and E. M. Stilwell.

III. SERIES OF WATER-COLOR SKETCHES, SHOWING THE BREEDING GROUNDS OF THE FUR SEAL (*CAL-LIRHINUS URSINUS*) ON THE PRYBILOFF ISLANDS, ALASKA. SKETCHED BY HENRY W. ELLIOTT FROM NATURE, AND EXHIBITED BY THE ALASKA COMMERCIAL COMPANY OF SAN FRANCISCO, CALIFORNIA.

- No. 1.** *The Fur Seal Rookery.* "REEF POINT." A view of one of the seven large fur seal breeding grounds on St. Paul's Island, Prybilov group, Alaska.
- No. 2.** *Gathering the Drive.* Seal drovers making the daily selection of seals for slaughter on Zoltoi sands, one of the twelve hauling grounds of the fur seal on St. Paul's Island, Alaska.
- No. 3.** *The Drive in Motion.* Fur seals being driven up to the slaughtering field near the village, St. Paul's Island, Alaska.
- No. 4.** *The Killing Field.* Natives slaughtering the fur seals; the skinned carcasses, &c., on the killing ground near the village, St. Paul's Island, Alaska.
- No. 5.** *Fur Seals Approaching their Breeding Grounds.* View of the manner in which the fur seals approach the Prybilov Islands, Alaska, while at sea.

SECTION C.

(THE FISHERIES.)

MEANS OF PURSUIT AND CAPTURE.

I. HAND IMPLEMENTS OR TOOLS.

1. CLUBS.

UNARMED CLUBS.

Salmon clubs used by the Indians of the Northwest coast.

651. Salmon-club. N. W. Coast. Geo. Gibbs.

Fishermen's clubs.

32717. "Halibut killer and gob-stick." Philip Merchant, Gloucester, Mass. A heavy club with which the fisherman kills the halibut by a blow upon the head. One end is sharpened for use in detaching hooks from the gullets of fish which have swallowed them.

2. KNIVES.

STRAIGHT KNIVES.

Splitting and ripping knives.

29401. Double-edged throating and ripping knife. A. McCurdy, Gloucester, Mass.

29403. Double-edged throating-knife (old style). G. B. Foster, Beverly, Mass.

29409. Throating or ripping knife. A. McCurdy, Gloucester, Mass.

29411. Throating or ripping knife. Capt. E. L. Rowe, Gloucester, Mass.

29416. Double-edged ripping-knife (peculiar to coast of Maine). Wilcox, Crittenden & Co., Middletown, Conn.

29402. Mackerel-splitting knife. A. McCurdy, Gloucester, Mass.

29408. Mackerel-splitting knife. Capt. Sam. Elwell, Gloucester, Mass.

29404. Codfish-splitting knife. A. McCurdy, Gloucester, Mass.

29413. Cod or haddock ripping knife (old style). G. P. Foster, Beverly, Mass.

29414. Hake or haddock splitting knife. A. McCurdy, Gloucester, Mass.

29415. Haddock-ripping knife. A. McCurdy, Gloucester, Mass.

Boarding-knives used by whalers.

Used in cutting the blubber into sections from the "blanket piece" or longstrip which is peeled from the sides of the whale.

25676. Boarding-knife. W. H. Cook & Co., New Bedford, Mass.

"This knife has seen many years of service."—A. R. C.

26608. Boarding-knife, with sheath. A. R. Crittenden, Middletown, Conn.

STRAIGHT KNIVES.**Whalemen's boat-knives.**

Used to cut the harpoon-line when it gets tangled in paying out.

— . Boat-knife (model). Capt. L. Howland, New Bedford.

Heading-knives.

32689. Halibut-heading knife. Adolph Voss, Gloucester, Mass.

Finning-knives.

29400. Halibut-finning knife. Alex. McCurdy, Gloucester, Mass.

29412. Halibut-finning knife. Capt. E. L. Rowe, Gloucester, Mass.

Chopping-knives.

39180. Bait-chopper. (New style). Alexander McCurdy, Gloucester, Mass.

29406. Bait-cleaver (used in halibut fishing). Alex. McCurdy, Gloucester, Mass.

32665. Cod-bait knife. Gloucester, Mass. U. S. Fish Commission.

32664. Bait-cleaver. " "

32672. Mackerel-bait knife (small). U. S. Fish Commission.

32671. Mackerel-bait knife (large). U. S. Fish Commission.

Cheek-knives.

29438. Codfish cheek-knife. Alex. McCurdy, Gloucester, Mass.

Throating-knives.

32669. Cod-throater (single edge). Gloucester, Mass. U. S. Fish Commission.

32670. Cod-throater (double edge). " "

Fish-knives (for general use).

26159. Fish-knife. Heavy. 12-inch blade. John Russell Cutlery Co. Turner's Falls, Mass.

26196. Fish-knife. Hook handle. 12-inch blade. John Russell Cutlery Co., Turner's Falls, Mass.

Scaling-knives.

26210. Saw-blade fish-scaling knife. John Russell Cutlery Co., Turner's Falls, Mass.

Sailors' and fishermen's sheath-knives.

Sailors' sheath-knives. Wilcox, Crittenden & Co., Middletown, Conn.

29428. Sheath and belt, with "law-abiding" sheath-knife. First quality.

29426. Sheath and belt. Second quality.

29427. Sheath and belt, with "law-abiding" sheath-knife. Third quality.

The "law-abiding" sheath-knife is round at the tip of the blade, which is also thick and dull.

Slivering-knives, used by fishermen.

These knives are used to slice the flesh from the sides of the menhaden used for bait. The slices thus prepared are called "slivers," and are salted down in barrels to be used as baits for cod, halibut, and mackerel hooks, or are ground up in the bait-mills, forming "stosh" or "chum," a thick paste which

STRAIGHT KNIVES.

Slivering-knives used by fishermen.

is thrown over the sides of the mackerel-smacks to toll the fish to the surface.

29407. Slivering-knife. (Pattern first used by Cape Ann fishermen.) Geo. B. Foster, Beverly, Mass.

29399. Slivering-knife. (Cape Ann pattern.) Alex. McCurdy.

39405. Slivering-knife. (Nantucket pattern.) Samuel Elwell, jr., Gloucester, Mass.

25764. Slivering-knife. Samuel Elwell, jr, Gloucester, Mass.

32666. Slivering-blade. Gloucester, Mass. U. S. Fish Commission.

Flitching-knives.

Used in slicing halibut into steaks or "fitches" in preparation for salting and smoking.

32726. Shore flitching-knife. Gloucester, Mass. U. S. Fish Commission.

32690. Bank flitching-knife. Adolph Voss, Gloucester, Mass.

Clam and oyster knives.

26209. Clam-knife. John Russell Cutlery Co., Turner's Falls, Mass.

Net-makers' knives.

These knives are without handles, and the heel of the short (2 inches long) round-pointed blade is curled so as to fit the finger like a ring.

29439. Net-mending knives (right-hand). Alex. McCurdy, Gloucester, Mass.

29440. Net-mending knives (left-hand). Alex. McCurdy, Gloucester, Mass.

Mackerel-rimmers' fattening-knives or ploughs.

Used in creasing the sides of lean mackerel (Nos. 2 and 3) to cause them to resemble fat (No. 1) mackerel.

25768. Mackerel-plough. Edwin Blatchford.

25769. Mackerel-plough. S. Elwell, jr., Gloucester, Mass.

25770. Mackerel-plough. S. Elwell, jr., Gloucester, Mass.

25771. Mackerel-plough. S. Elwell, jr., Gloucester, Mass.

25773. Mackerel-plough. Edward Davis.

25774. Mackerel-plough. Edward Davis.

Splitting-knives.

Used in cleaning fish before salting.

32673. Mackerel-splitting knife. Gloucester, Mass. U. S. Fish Commission.

32667. Cod-splitting knife (curved). " "

32668. Cod-splitting knife (straight). " "

Stone and bone knives used by Indians and Eskimos.

7224. Bone knife. Anderson River Eskimos, Fort Anderson, H. B. T. R. McFarlane.

16115. Bone knife. Magemut Eskimos, Nunivak Islands, Alaska. W. H. Dall.

2178. Bone knife. Eskimos.

1328. Bone knife. Eskimos.

3. AXES.

AXES, PROPER.

Head-axes for whalemén.

Used in cutting off head of whale.

25913. Head-axe. E. B. & F. Macy, New Bedford, Mass.

CUTTING-SPADES.

Whale-cutting spades.

Used in peeling the blubber from the carcass of the dead whale.

25679. Cutting-spade. E. B. & F. Macy, New Bedford, Mass.

25008. Cutting-spade. J. H. Thomson, New Bedford, Mass.

Throat spades, flat and round shank.

Used in cutting off the head of the whale.

25925. Throat-spade. E. B. & F. Macy, New Bedford, Mass.

Half-round spades.

For cutting "blanket" piece, to allow blubber-hook to enter.

25927. Half-round spade. E. B. & F. Macy, New Bedford, Mass.

Head-spades.

Used in cutting off the head of the whale.

25932. Head-spade. E. B. & F. Macy, New Bedford, Mass.

Blubber-mincing spades.

For mincing blubber before trying out.

25912. Hand mince-knife. E. B. & F. Macy, New Bedford, Mass.

Chopping-knives.

Used to chop clams for bait.

29489. Clam-chopper. William H. Hesbolt, Provincetown, Mass.

32676. Clam-chopper. Adolph Voss, Gloucester, Mass.

Ice-choppers.

Used in chopping ice for packing fish or bait.

32686. Ice-chopper. Adolph Voss, Gloucester, Mass.

Ice-chisels.

Used in cutting holes in the ice for fishing.

25888. Ice-chisel (nickel-plated). Bradford & Anthony, Boston, Mass.

4. THRUSTING SPEARS AND PRODS.

FISHING-LANCES.

Whale-lances.

Used by whalers to give the death-blow to the whale.

25678. Whale-lance with handle, ready for use. E. B. & F. Macy, New Bedford, Mass.

25007. Whale-lance with handle, ready for use. J. H. Thomson, New Bedford, Mass.

FISHING-LANCES.

Whale-lance, iron.

25611. Whale-lance. (Primitive model) used by New Bedford whalers.
W. H. Cook & Co., New Bedford, Mass.

Seal-lances.

16110. Seal-lance head. Eskimo. Nunwak. W. H. Dall.
19382. " " " "
16343. " " " "
1117. Seal-lance. Eskimos of Arctic coast, Anderson River, H. B. T. R.
McFarlane.

Fish-lances.

29453. Sword-fish lance. Saml. Elwell, jr., Gloucester, Mass.
32702. Sword-fish lance. Vinald McCaleb, Gloucester, Mass.

WHALEMAN'S BOAT-SPADES (thick and thin).

Carried in boat to disable the whale by cutting its flukes.

25928. Boat-spade, with handle and warp complete, ready for use. E. B.
& F. Macy, New Bedford, Mass.

PRODDING INSTRUMENTS.

Snow-probes.

Used by the Eskimos in probing the air-holes in ice and under the snow to detect the presence of seals.

10274. Bone probe.¹ King William's Land. Capt. C. F. Hall.
10275. Bone probe.¹ " " "
10276. Bone probe.¹ " " "

Probing-awls.

Used in piercing the base of the brain in killing fish for the table.

29418. Large steel prod, suitable for large fish. A. R. Crittenden, Middle-
town, Conn.

II. IMPLEMENTS FOR SEIZURE OF OBJECT.

5. SCOOPS.

SHOVELS.

Oyster-shovels.

26717. (Model, with Chesapeake oyster-canoe.) T. B. Ferguson, Maryland
Commissioner of Fisheries.

¹ These probes are sometimes supplied with a detachable head.

SHOVELS.

Bait-ladles.

32652. "Bait-heaver" (one-sided). Gloucester, Mass. G. Brown Goode.

HAND-DREDGES (used in collecting mollusks).

26718. Tin hand-dredge. U. S. Fish Commission.

PILE-SCRAPERS.

26719. Frame of pile-scraper. U. S. Fish Commission.

6. HOOKED INSTRUMENTS. (Those used with a single motion, that of hooking.)

SINGLE-POINTED HOOKS.

Gaff-hooks.

25225. Gaff-hook. U. S. Fish Commission.
 25495. Salmon-gaff hook and staff. Bradford & Anthony, Boston, Mass.
 39202. Salmon-gaff, with bamboo handle. Gaff detachable from the handle.
 U. S. Fish Commission. (C. B. & M.)
 29388. Halibut-gaff. M. W. Grant, Wellfleet, Mass.
 32678. Halibut hand-gaff. Gloucester, Mass. G. Brown Goode.
 32683. Halibut deck-gaff. " " "
 25935. Haddock hand-gaff. A. McCurdy, Gloucester, Mass.
 29390. Haddock-gaff. M. W. Grant, Wellfleet, Mass.
 25938. Cod-fish gaff. Used in George's Bank fisheries. A. McCurdy, Gloucester, Mass.
 25939. Dory cod-gaff. Used in shore fisheries. A. McCurdy, Gloucester, Mass.
 25934. Hand-gaff. Used in halibut fisheries. A. McCurdy, Gloucester, Mass.
 29389. Cod-gaff. M. W. Grant, Wellfleet, Mass.
 32716. "Pew." Used in handling fish on wharves and decks. Capt. S. J. Martin, Gloucester, Mass.
 32685. "Pew-gaff." Used in pitching fish from dories to vessels. Gloucester, Mass. G. Brown Goode.
 32730. Fish-fork (three tines, short handle). Gloucester, Mass. G. Brown Goode. Used in pitching fish in a dory, or from hold of vessel.
 32691. Halibut-cutter's hook. Used by the "header" in decapitating halibut. Gloucester, Mass. G. Brown Goode.
 32684. Fish-fork (two tines). Gloucester, Mass. G. Brown Goode.
 32725. "Nape-boner" hook. Used in the preparation of boneless fish. Gloucester, Mass. G. Brown Goode.
 25616. Gaff-hook.

Boat-hooks.

Arranged with "Accessories of fishing-boats," B. 48.

Squid forks.

32727. Squid fork used in baiting with squid. Gloucester, Mass. U. S. Fish Commission.

SINGLE-POINTED HOOKS.

Forks used for handling salted and dried fish.

Whalemen's hooks.

Blubber hooks.

25930. Blubber-hook. For hauling small pieces of blubber. E. B. & F. Macy, New Bedford, Mass.

Blubber forks and pikes.

25615. Blubber-pike. Used for tossing blubber into try-kettle. Humphrey S. Kirby, New Bedford, Mass.
25617. Blubber-pike. From the storeroom of a returned whaler. Humphrey S. Kirby, New Bedford, Mass.

Junk-hooks, etc.

- For hauling heavy pieces of blubber.
25916. Junk-hook. E. B. & F. Macy, New Bedford, Mass.

¹Lance-hooks.

MANY-POINTED HOOKS.

¹Can-hooks.

²Grappling-irons.

Lip-hooks or grappels, used by whalers.

Line-hooks, used by whalers.

25924. Whaler's line-hook for catching line, &c. E. B. & F. Macy, New Bedford, Mass.

Clam-rakes.

29466. Clam-hoe. Provincetown style. Wm. H. Hesbolt, Provincetown, Mass.
29437. Hand-claw. Used for gathering "hen-clams" and "scallops." Wellfleet, Cape Cod, and coast of Maine. M. W. Grant, Wellfleet, Mass.
— . Clam-rake (model). Used in collecting the sea-clam (*Macra solidissima*) on Nantucket Shoals. These clams are salted down and used as bait for cod, halibut, &c. See with model of Nantucket dory (26257).
36045. Clam-rake. Wellfleet style. U. S. Fish Commission.
36046. " " " " "
36047-9. " " " " "

Moss-rakes.

32718. Rakes used in gathering Irish moss (*Chondrus crispus*). C. A. Cole, Scituate, Mass.

Sponge-hooks.

32693. Sponge-hook. Appalachicola, Florida. Silas Stearns.

¹Arranged with boat fittings.

²Arranged with the anchors.

MANY-POINTED HOOKS.

Many-pointed fish-jigs.

29436. Mackerel-gaff. Used when the mackerel swim close in large shoals. M. W. Grant, Wellfleet, Mass.
 29441. Mackerel-bob. Used when the mackerel are close to the vessel and in large schools. Wm. H. Hesbolt, Provincetown, Mass.

Oulachan rakes or spears.

- Used by Indians of the northwest coast in the capture of the oulachan or candle-fish (*Omerus pacificus*).
 Oulachan rake or comb. Flathead Indians. J. G. Swan.

Squid-jigs.

25714. Squid-jig. George P. Steel, Provincetown, Mass.
 25776. Squid-jig. Gloucester style. A. R. Crittenden, Middletown, Conn.
 29443. Squid-jig. Over fifty years old. Lemuel Cook, 2d, Provincetown, Mass.
 32721. Squid-jig. Capt. R. H. Hurlbert, Gloucester, Mass.
 32722. Squid-jig. " " "
 39177. Old-style squid-jig. U. S. Fish Commission.
 39176. Squid-jig. Commonly made by the fishermen on board ship. U. S. Fish Commission.
 29447. Molds used in forming squid-jigs. John B. Parsons, Rockport, Mass.

7. BARBED IMPLEMENTS. (Those used with two motions, the first that of thrusting.)

SPEARS WITH FIXED HEADS.

Barbed spears (with single point).

25594. Crab-spear, used about Newport, R. I. J. M. K. Southwick, Newport, R. I.
 25595. Flounder-spear. J. M. K. Southwick, Newport, R. I.
 39426. "Conch" harpoon. Used by Bahamians and fishermen of Key West in the capture of large fish. Dr. J. W. Velie, Chicago, Ill.

Eel-spears.

39203. Fish-spear (size No. 1). U. S. Fish Commission. (C. B. & M.)
 39204. Fish-spear (size No. 2). " "
 39205. Fish-spear (size No. 3). " "
 39206. Eel-spear (with six prongs). " "
 39207. Eel-spear (with ten prongs). " "
 25558. Eel-spear with ten prongs for winter fishing. Lent by Bradford & An-
 [thony, Boston, Mass.
 25557. Eel-spear for summer fishing. "
 25556. Nine fish-spears. "
 25224. Eel-spear, used in Southern New England. U. S. Fish Commission.
 25647. New Bedford eel-spear. H. S. Kirby, New Bedford, Mass.
 26072-3-4. Adjustable-prong eel-spear. S. P. Hedges.
 29491. Eel-spear.
 29491. Neptune eel-spear.

SPEARS WITH FIXED HEADS.

Aboriginal fish-spears.

10390. Fish-spear. Frobisher Bay, Arctic Ocean. Capt. C. F. Hall.
 7420. Head of fish-spear. Eskimos. Fort Anderson, Arctic coast. R. McFarlane.
 2675. Heads of fish-darts. Eskimos. Mackenzie's River district. R. McFarlane.
 7514. Head of fish-spear, made of elk-horn. Eskimos. Northwest coast. George Gibbs.
 2322. Head of salmon-spear. Indians. Fort Crook, Oreg. Lieut. John Feilner, U. S. A.
 2628. Fish-dart heads. Indians. Columbia River. U. S. Exploring Expedition. Capt. C. Wilkes, U. S. N.
 1439. Lance-head of bone. Indians. New Mexico. Lieut. A. W. Whipple, U. S. A.
 18933. Fish-spears. Sitka Indians. Sitka. J. G. Swan.
 11429. Salmon-spears. Passamaquoddy Indians. Eastport, Me. E. Palmer.
 10283. Salmon-spear. Eskimos. Igloodik. Capt. C. F. Hall.
 2543. Fish-spear. Tschutshi Indians. South Pacific Exploring Expedition. Capt. John Rodgers, U. S. N.
 23518. Three-pronged spear. Northwest coast. J. G. Swan.
 15950. Fish-spear. Magemut Eskimos. Nunivak, Alaska. W. H. Dall.
 11358. Fish or bird spear. Eskimos. Bristol Bay, Alaska. Vincent Colyer.
 7973-7997. Fish and bird spears. Mushegay Indians. Alaska. Smithsonian Institution.

SPEARS WITH DETACHABLE HEADS.

Lily-irons.

32703. Lily-iron. Gloucester. Vinal McCaleb.
 25230. Sword-fish lily-iron. Capt. John B. Smith. U. S. Fish Commission.
 25645. Sword-fish dart and socket, peculiar to New Bedford. A. R. Crittenden, Middletown, Conn.
 32714. Sword-fish lily-iron. Adolph Voss, Gloucester, Mass.
 32715. Sword-fish lily-iron. " " "
 25208. Sword fish-dart head. Wilcox, Crittenden & Co., Middletown, Conn.
 39427. "Turtle-peg" harpoon. Key West, Fla. Dr. J. W. Velie, Chicago, Ill.

Eskimo harpoons of stone, bone, and iron.

14255. Iron harpoon-head, with line of walrus hide. Eskimos. Smith Sound. Capt. C. F. Hall.
 10120. Harpoon-head, brass and iron. Eskimos. Victoria Harbor. Capt. C. F. Hall.
 9838. Harpoon-heads of bone and iron. Eskimos. Northeast coast. S. F. Baird.
 15596. Whaling-lance. Poonook, Alaska. H. W. Elliott.
 10272. Seal spear.
 10271. Seal spear.
 10264. Seal spear.
 19522. Harpoon-head of stone and bone. Eskimos. Greenland. Geo. Y. Nickerson.
 10136. Head of Walrus-harpoon. Eskimos. Igloodik. Capt. C. F. Hall.

SPEARS WITH DETACHABLE HEADS.

Eskimo harpoons of stone, bone, and iron.

10404. Part of ancient Inuit harpoon-head. Repulse Bay. Capt. C. F. Hall.
10273. Handle of whaling-harpoon made of bone and wood. Eskimos. Greenland. Smithsonian Institution.
19519. Handle of whaling-harpoon made of wood and bone. Eskimos. Greenland. Geo. Y. Nickerson.
10265. Whaling-harpoon. Eskimos. Northwest coast. Smithsonian Institution.
19518. Whaling-harpoon of recent manufacture, with head of bone and iron, handle of wood and iron, and seal-skin line. Eskimos. Greenland. Geo. Y. Nickerson.
565. Harpoon-head of bone and iron with walrus-hide line. Eskimos. Port Foulke. Dr. I. I. Hayes.
2186. Seal-harpoon head of bone and iron. Eskimos. Anderson River. R. McFarlane.
13140. Walrus-harpoon head of bone and iron, hide line. Inuit Eskimos. Greenland. S. F. Baird.
19376. Bone harpoon-head with hide line. Eskimos. Alaska. Rev. James Curley.
15631. Miniature model of seal-harpoon. Eskimos. Alaska. H. W. Elliott.
1678. Miniature model of seal-harpoon. Eskimos. Alaska. W. H. Dall.
- 16120-21-22-25, 5606-7621. Seal-harpoon heads of bone and iron. Eskimos. Nunivak Islands, Alaska. W. H. Dall.
15619. Harpoon-head of bone. Eskimos. Alaska. H. W. Elliott.
2674. Seal-harpoon heads of bone. Anderson River Eskimos. Fort Anderson. R. McFarlane.
- 5815, 7440. Seal-harpoon heads of bone and iron. Anderson River Eskimos. Mackenzie's River district. R. McFarlane.
4131. Four models of whaling-harpoons, lines and throats. Makah Indians. Neah Bay, Wash. J. G. Swan.
1869. Head of whaling-harpoon, with line. Makah Indians. Cape Flattery, Wash. Geo. Suckley.
- This harpoon-head is made from the shell of a large species of *Mytilus*, and illustrates the methods of manufacture employed by Indians of the Northwest coast previous to the introduction of metal by the white man.
- 20696-7. Head of whaling-harpoon and line. Makah Indians. Sitka, Alaska. J. G. Swan.
- This harpoon-head is constructed of sheet-iron, and shows the method now employed in the manufacture of the weapons. The rope and covers are made from the bark of *Thuja gigantea*.
828. Head of whaling-harpoon, with line. Makah Indians. Neah Bay, Wash. Ter. J. G. Swan.
16118. Hand-harpoon. Alaska.
7963. Spear-head and line. Mushagak Indians.
1868. Head of whaling-harpoon with line. Makah Indians. Neah Bay, Wash. Ter. J. G. Swan.
2530. Harpoon-darts. Eskimos. Alaska. North Pacific Exploring Expedition. Capt. John Rodgers.
16675. Harpoon-dart. Kotzebue Sound. W. H. Dall.
- 5775-6-7-9-80. Harpoon-darts. Sitka, Alaska. W. H. Howard, U. S. R. M.

SPEARS WITH DETACHABLE HEADS.

Harpoon-spears.

6564. Head of barbed fish-dart, made of native copper. Eskimos. Sitka, Alaska. Dr. T. T. Minor.
9083. Head of barbed fish-dart, made of native copper. Alaska. Lieut. F. W. Ring, U. S. N.
20653. Head of barbed fish-dart of native copper with line of twisted sinew. Alaska. Smithsonian Institution.
21413. Fish-spear with detachable barb. Hoochuon Indians. South Eel River, California. Stephen Powers.
39428. Double-pronged spears with detachable heads. McCloud River Indians, Shasta Co., Cal. Livingston Stone. These spears are used in the capture of the *Salmo quinnat*. The handles are thirty feet in length. The barbs are made from the splint bones of deer. See No. 13743, below.
19046. Fish-spear with detachable barbs. Cooyunu Pi-Ute Indians. Pyramid Lake, Nevada. Stephen Powers.
13743. Points for salmon-spear made of the splint bones of the deer. McCloud River Indians. Shasta Co., Cal. Livingston Stone.
650. Harpoon-arrows with iron tips. Indians. Cape Flattery. Wash. Ter. Geo. Gibbs.
21308. Wooden barbs for fish-harpoon. Indians. Hoopah Valley, Cal. Stephen Powers.
2249. Head of fish-harpoon. Eskimos. Anderson River. R. McFarlane.
11356. Harpoon-dart with bladder-float. Nashegay Indians. Alaska. Dr. T. T. Minor.
11362. Harpoon-dart with bladder-float. Nashegay Indians. Alaska. Dr. T. T. Minor.
7998. Harpoon-dart with bladder-float. Nashegay Indians. Alaska. Dr. T. T. Minor.

8. TONGS, &C.

TONGS (with two handles).

Oyster-tongs.

26110. Oyster-tongs. S. Salisbury, Providence, R. I.
26109. Oyster-tongs. " " "
25205. Oyster-tongs. Wilcox, Crittenden & Co., Middletown, Conn.
29111. Oyster-nippers. S. Salisbury, Providence, R. I.

9. TANGLES.

The tangles are employed by naturalists for the purpose of gathering small spiny animals, such as sea-urchins and star-fishes, from the bottom at considerable depths. They adhere to the fibers of the spun-yarn in great numbers. It has been thought that this instrument might advantageously be employed in freeing oyster-beds from their worst enemies, the star-fish.

SWAB-TANGLES.

Swab-tangles.

26844. Swab-tangles. U. S. Fish Commission.

HARROW-TANGLES.

Harrow-tangles.

26845. Models of harrow-tangles. U. S. Fish Commission. Formerly used by the Fish Commission, now replaced by the wheel-tangles.

WHEEL-TANGLES.

Wheel-tangles.

26846. Model of wheel-tangles. U. S. Fish Commission.

26848. Wheel-tangles. U. S. Fish Commission.

 III. MISSILES.

* *Simple missiles (those propelled by the unaided arm).*

10. HURLED SPEARS.

DARTS AND LANCES.

See under "Lances and spears," above enumerated, many of which may be used as missiles.

** *Centrifugal missiles. (Propelling power augmented by an artificial increase of the length of the arm.)*

11. MISSILES PROPELLED BY "THROWING-STICKS."

SPEARS (with throwing-sticks, used by Eskimos).

See above under "Bird and fish spears," particularly No. 10267, a spear with throwing-stick attached.

7899. Throwing-stick. Eskimos. Aleutian Islands. Dr. T. T. Minor.

7933. Throwing-stick. Eskimos. Kodiak. "

16076. Throwing-stick. Eskimos. Unalashka. W. H. Dall.

2267. Throwing-stick. Eskimos. Smithsonian Institution.

5774. Throwing-stick. Eskimos. Sitka. W. A. Howard, U. S. R. M.

20771. Throwing-stick. Eskimos. Sitka. J. G. Swan.

7423. Throwing-stick.

14905. Throwing-stick.

*** *Missiles propelled by a spring.*—(*Spring consisting of bent rod.*)

12. BOWS AND ARROWS.

ARROWS.

Harpoon-arrows, used in fishing.

11348-52. Harpoon-arrows. Eskimos. Bristol Bay, Alaska. Vincent Colyer.

15677-15681-82. Harpoon-arrows. Eskimos. Nunivak Islands, Alaska. W. H. Dall.

19379. Harpoon-arrow. Eskimos. Alaska. Rev. J. Curley.

8005-6-9. Harpoon-arrows. Eskimos. Nushegay Indians. Dr. T. T. Minor.

**** *Explosives.*

13. GUNS.

WHALING GUNS.

24986. C. C. Brand's improved whaling-gun. Patented June 22, 1852. For use with C. C. Brand's improved bomb-lance. 24987. Powder-flask with charger. 24988. Wad-cutter. 25989. Wad-cutter (inside). 24992. Prepared wads. 24990, 24991. Screw-drivers. C. C. Brand, Norwich, Conn.

24993-97. C. C. Brand's improved bomb-lance. Patented June 22, 1859. For use with C. C. Brand's improved whaling-gun. 24997. Exploded lance. 24998. Lance-hook (for drawing charge). C. C. Brand, Norwich, Conn.

25251. E. Pierce's harpoon-gun. Patented 1865. U. S. Fish Commission.

42762. Freeman's harpoon-gun. Made by Freeman & Lincoln, Brewster, Mass.

IV. BAITED HOOKS. ANGLING-TACKLE.

14. HOOKS WITH MOVABLE LINES.

TACKLE FOR SURFACE-FISHING.

Fly-fishing tackle.

Salmon-tackle.

Trout-tackle.

Black-bass tackle.

Shad-tackle.

Trolling-tackle:

Trolling-tackle.

Whiffing-tackle.

Drailing-tackle.

The parts of these gears may be seen in their proper places, with hooks, lines, &c.

TACKLE FOR SURFACE-FISHING.

Surf-tackle for throwing and hauling.

Blue-fish tackle.

- 24808-9. Blue-fish line. Rigged with eel-skin squids. J. M. K. Southwick, Newport, R. I.
 24802-7. Blue-fish lines. Rigged with cloth squid. Block Island. J. M. K. Southwick, Newport, R. I.

TACKLE FOR FISHING BELOW THE SURFACE.

Short hand gear.

25684. Mackerel-lines and cleats. Bradford & Anthony, Boston, Mass.
 29293. "Otter," with line and flies attached. Used in lake and river fishing. William Morris, Lake City, Minn.
 19047. Throw-line with minnow-hooks. Cooyuwee Pi-Utes. Pyramid Lake, Nevada. Stephen Powers.

Deep-sea gear.

25687. Gear, used by American fishermen on George's Banks. Bradford & Anthony, Boston, Mass.
 29483. Cod-fishing gear. Used from 1812-1830. Lemuel Cook, 2d, Provincetown, Mass.
 25686. Cod hand-line and gear. Used chiefly on Western and Grand Banks of Newfoundland, Bradford & Anthony, Boston, Mass.
 25685. Pollock line and gear. Bradford & Anthony, Boston, Mass.
 24810-11. Rigged tautog-lines. J. M. K. Southwick, Newport, R. I.
 25665. Lines. Rigged for pond-fishing. Wm. M. Young, Philadelphia, Pa.
 1140. Halibut-hook, with kelp line. Makah Indians. Puget Sound, W. T. J. G. Swan.
 39187. Cod-fishing gear with a 1-pound lead. Used in the shore cod-fishery. U. S. Fish Commission.
 39186. Cod-fishing gear with 1½-pound lead. Used in the shore fishery. U. S. Fish Commission.
 39185. Cod-fishing gear, with 3¼-pound lead. Used in the shore fishery. U. S. Fish Commission.
 39182. Cod fishing gear, with 9-pound lead. Used in the George's Bank cod-fishery. (Wooden "horse".) U. S. Fish Commission.
 39184. Cod-fishing gear, with 9-pound lead. Used in the George's Bank cod-fishery. (Furnished with brass "horse".) U. S. Fish Commission.
 39183. Rope "horse" used with the George's Bank gear, made by fishermen. U. S. Fish Commission.
 39190. Brass pieces used with the cod-fishing gear.

The shore and George's Bank fishery gears (Nos. 39190-2-4, 39185-7), are pronounced to be the best ever manufactured and are coming into use quite extensively. The lead being round at the bottom prevents fouling. This style of lead also sinks more quickly than the ordinary kind. The patent swivels used with this gear are very useful; they allow the insertion of new hooks with little inconvenience or loss of time.

15. HOOKS, WITH STATIONARY LINES.—SET TACKLE.

BOTTOM-SET LINES.

Trawl-lines, or bull-tows.

25688. Model of codfish-trawl, used by American fishermen on Western and Grand Banks of Newfoundland. Buoys, scale of one-sixth; anchors, scale of one-fifteenth. Bradford & Anthony, Boston, Mass.
29469. Section (one-fifth) of trawl-line. Used in George's Banks cod-fisheries. A. R. Crittenden, Middletown, Conn.
6560. Trawl-line and hooks. Indians of Vancouver's Island. Dr. T. T. Minor.
32705. One section of "skate" of a halibut trawl-line with (No. 32706) inner-buoy with flag, (No. 32707) outer buoy with "black-ball," (No. 32708) buoy-line, and (No. 32709) anchor. Capt. Jos. W. Collins and Philip Merchant, Gloucester, Mass.

Set-traps.

25562. Pickerel-traps. With lines and flags for fishing through the ice. Bradford & Anthony, Boston, Mass.
25563. Set of implements for smelt-fishing through the ice.
25667. Fishing-bows. W. M. Young, Philadelphia, Pa.

16. (ACCESSORY.) PARTS AND ACCESSORIES OF ANGLING-APPARATUS AND OF HARPOON AND SEINE LINES.

HOOKS (including a full series of unmounted hooks, of recent and aboriginal manufacture).

Plain hooks.

25632. The ten processes through which American hand-made fish-hooks pass from the wire to the finished hook. Made entirely by hand-labor in the factory of J. W. Court, Brooklyn, N. Y. Bradford & Anthony, Boston, Mass.
25524. Double-refined cast-steel, tapered point; Virginia hooks, flatted, Nos. 10 to 1 and 1-0 to 3-0. American Needle and Fish-Hook Company, New Haven, Conn.
25535. Superfine cast-steel blackfish-hooks, japanned, flatted, Nos. 1 to 8. American Needle and Fish-hook Company, New Haven, Conn.
25536. Eel-hooks, No. 6. American Needle and Fish-Hook Company, New Haven, Conn.
25640. Halibut-hooks, ringed; Nos. 1 to 3. American Needle and Fish-Hook Company, New Haven, Conn.
25528. Cast-steel Kirby sea fish-hooks, flatted; Nos. 1 to 12. American Needle and Fish-Hook Company, New Haven, Conn.
25530. Cast-steel Kirby sea fish-hooks, ringed; Nos. 1 to 12.
25529. Superior cast-steel Kirby sea fish-hooks, galvanized, flatted; Nos. 1 to 8. American Needle and Fish-Hook Company, New Haven, Conn.
25522. Double-refined cast-steel Kirby river and trout fish hooks, ringed; Nos. 1 to 12 and 1-00 to 10-0. American Needle and Fish-Hook Company, New Haven, Conn.

HOOKS (including a full series of unmounted hooks, of recent and aboriginal manufacture).**Plain hooks.**

25523. Kirby river and trout fish-hooks, flattened, extra superfine; Nos. 1 to 12 and 1-0 to 10-0. American Needle and Fish-Hook Company, New Haven, Conn.
25519. Superfine spring steel Kirby salmon, flattened; Nos. 12 to 3-0. American Needle and Fish-Hook Company, New Haven, Conn.
25520. Carlisle trout-hooks, flattened; Nos. 12-20. American Needle and Fish-Hook Company, New Haven, Conn.
25521. Carlisle trout-hooks, ringed; Nos. 8 to 3-0. American Needle and Fish-Hook Company, New Haven, Conn.
25516. Superfine cast-steel Limerick salmon, flattened; Nos. 1-0 to 12 and 2-0 to 10-0. American Needle and Fish-Hook Company, New Haven, Conn.
25517. Superfine cast-steel Limerick salmon, ringed; Nos. 1-0 to 9 and 2-0 to 10-0. American Needle and Fish-Hook Company, New Haven Conn.
25514. Double-refined cast-steel Limerick river and trout fish-hooks (spear-points, flattened); Nos. 1-0 to 12 and 2-0 to 10-0. American Needle and Fish-Hook Company, New Haven, Conn.
25515. Double-refined cast-steel Limerick river and trout fish-hooks (spear-head points, flattened, shanks ringed); Nos. 1-0 to 12 and 2-0 to 10-0. American Needle and Fish-Hook Company, New Haven, Conn.
25518. Extra spring-steel Aberdeen trout-hooks, flattened; Nos. 8 to 4-0. American Needle and Fish-Hook Company, New Haven, Conn.
25525. Superfine spring-steel Kinsey trout-hooks, flattened; Nos. 6 to 16. American Needle and Fish-Hook Company, New Haven, Conn.
25591. Superfine steel Kinsey trout-hooks, ringed; Nos. 10 to 16. American Needle and Fish-Hook Company, New Haven, Conn.
25534. Cast-steel drop-point mackerel-hooks, large and small wire, flattened; Nos. 1 A to 5 A, and 2 B to 4 B. American Needle and Fish-Hook Company, New Haven, Conn.
25527. Superfine cast-steel J. P. cod-hooks, ringed; Nos. 1 to 8. American Needle and Fish-Hook Company, New Haven, Conn.
25526. Superfine cast-steel J. P. cod-hooks, flattened; Nos. 1 to 8. American Needle and Fish-Hook Company, New Haven, Conn.
25532. Central-draught cod-fish hooks, eyed; Nos. 10 to 17. American Needle and Fish-Hook Company, New Haven, Conn.
25533. Double-refined cast-steel, original, central-draught cod or mackerel hooks, ringed; Nos. 12 to 20. American Needle and Fish-Hook Company, New Haven, Conn.
42898. Cod-hooks, for sea fishing. U. S. Fish Commission.
42899. The "Edgar" barbless hook. "
25221. Dogfish hook and chain.
25531. Double-refined cast-steel, original, central-draught cod or mackerel hooks, flattened. American Needle and Fish-Hook Company, New Haven, Conn.
25601. Cod-hooks. Used when fish rise to the surface. J. M. K. Southwick, Newport, R. I.
25538. Shark-hooks. Bradford & Anthony, Boston, Mass.
29465. Shark-hooks. M. W. Grant, Wellfleet, Mass.
25648. Shark-hook. (Extraordinary.) A. R. Crittenden, Middletown, Conn.

HOOKS (including a full series of unmounted hooks, of a recent and aboriginal manufacture).**Plain hooks.**

29464. Ground-shark hook. Style used forty years ago. Elisha Cook Provincetown, Mass.
25602. Dogfish hook with chain. Used at Newport, R. I. J. M. K. Southwick, Newport, R. I.
25641. Dogfish hooks, ringed. American Needle and Fish-Hook Company, New Haven, Conn.
29467. Horse-mackerel hook. John Thomas, Belfast, Me.
29505. Hooks, probably lost by a French fishing-vessel. Found on St. George's Banks on a piece of trawl; fished up by Geo. H. Lewis, Provincetown, Mass.
32732. French cod-hooks; taken from codfish on Jeffries Ledge. Capt. James Tarr, Gloucester, Mass.
32731. French cod-hook; taken from codfish in Salvages' Shoals, Cape Ann, in 1856. Capt. James Tarr, Gloucester, Mass.
20654. Wooden fish-hooks. Indians of Northwest coast. Bella Bella, B. C. J. G. Swan.
- . Fish-hooks. Indians of Northwest coast of America. Straits of Fuca, Puget Sound. U. S. Exploring Expedition.
1051. Fish-hooks. Puget Sound. George Gibbs.
9765. Fish-hook. Wallapai Indians. E. Palmer.
5583. Fish-hook of wood and bone. Gens des Fous Indians. Yukon River, Alaska, W. H. Dall.
9807. Fish-hook and line. Chilkah Indians. Alaska. Lieut. F. W. Ring, U. S. A.
5590. Fish-hooks and sinkers. Premorska Indians. St. Michael's, Alaska. W. H. Dall.
19064. Fish-hooks. Cooyuwee Pi-Ute Indians. Pyramid Lake, Nev. Stephen Powers.
20651. Fish-hook. Bella Bella, B. C. J. G. Swan. Indian make.
9270. Halibut-hook. Alaska. Dr. Hoff, U. S. A. " "
- . Halibut-hook. Sitka, Alaska. J. G. Swan. " "
- 9103-4. Halibut-hooks. Alaska. Lieut. F. W. Ring, U. S. A. " "
1141. Butt-end of hemlock limb for making halibut-hook. Makah Indians. Puget Sound, W. T. J. G. Swan.
16346. Halibut-hooks. Yakutat Eskimo. W. H. Dall.
2630. Fish-hook. Northwest coast of America. Capt. Chas. Wilkes, U. S. N. U. S. Exploring Expedition.
1324. Hooks and lines. Eskimo. Anderson River. C. P. Gaudet.
1989. Fish-hook. Arctic America. B. R. Ross.
5118. Fish-hook. Anderson River Eskimos. Mackenzie's River district. R. Kennicott.
9116. Fish-hook. Fort Anderson Eskimos. Mackenzie's River district. R. MacFarlane.
96822. Fish-line of kelp (*Nereocystis*), fish-hook, and bladder buoy. Makah Indians. Neah Bay. J. G. Swan.
1123. Fish-hook of bone and wood. Yukon River. Wm. H. Dall.
- . Fish-hook of bone and wood. Fort Simpson.
9807. Fishing line and hook. Chilkah Indians. Alaska. Lieut. F. W. Ring, U. S. A.
15630. Bone fish-hook with whalebone snood. Alaska. H. W. Elliott.
16315. Fish-hook. Sitka. W. H. Dall.

HOOKS (including a full series of unmounted hooks, of recent and aboriginal manufacture).**Plain hooks.**

652. Halibut-hooks. Indians of northwest coast of America. George Gibbs.
20656. Halibut-hooks. Indians of Fort Simpson, B. C. J. G. Swan.
15635. Fish-hooks. Eskimos. Poonook, Alaska. H. W. Elliott.
10142. Fish-hooks. Eskimos. Victoria Harbor. Capt. C. F. Hall.
14280. Fish-hooks. Neah Bay, W. T. James G. Swan.
16116. Bone hook. Magemut Eskimos. Nunivak, Alaska. W. H. Dall.
16311. Fish-hooks. Nunivak Islands, Alaska. W. H. Dall.
1051. Fish-hooks. Capt. Chas. Wilkes, U. S. N. U. S. Exploring Expedition.
10219. Codfish-hook. Eskimos. Coast of Greenland. Capt. C. F. Hall.
- 2191-92. Fish-hooks of stone, bone, and iron. Fort Anderson Eskimos. Mackenzie's River district. R. Kennicott.
- 2093, 2248. Fish-hooks of bone and iron. Anderson River Eskimos. R. MacFarlane.
- 16311-12. Bone hooks and line spreaders. Thlinket Eskimos. Sitka, Alaska. W. H. Dall.
- 5118-7441. Hooks of bone and iron. Mackenzie's River Eskimos. R. MacFarlane.
32660. Smelt-spreader and hooks. Gloucester, Mass. G. Brown Goode.
25561. Spring-hooks for pickerel. Bradford & Anthony, Boston, Mass.
42879. Spring-hooks and patent "snap and catch'em" hooks for pickerel, etc. U. S. Fish Commission.

Jigs and drails.

42897. Tinned bluefish hooks. U. S. Fish Commission.
29448. Bass and bluefish drail. Elisha Cook, Provincetown, Mass.
29425. Bluefish-drail. Provincetown style. Lemuel Cook, 2d, Provincetown, Mass.
29485. Bluefish-drails. Used in Wellfleet, Mass., about 1830. Newell B. Rich, Wellfleet, Mass.
25555. Bluefish-drails. Bradford & Anthony, Boston, Mass.
- Bluefish-hooks. Collected by A. R. Crittenden, Middletown, Conn.
25550. Bluefish-drail. Bradford & Anthony, Boston, Mass.
25771. Bluefish-drails. (Made in the form of a squid and very killing.) Peculiar to Provincetown, Mass. Coleman Cook, Provincetown, Mass.
25553. Bluefish-drail. Wm. H. Young, Brooklyn, N. Y.
25669. Bluefish-drail. Peculiar to Hyannis, Mass. Freeman Hallett, Hyannis, Mass.
25671. Bluefish-drail. Peculiar to Chatham, Mass. Sanford Freeman, Norwichport, Mass.
- 25671 (?) Bluefish-drail. J. H. Bartlett & Sons, New Bedford, Mass.
25537. Series of hollow bone bluefish-squids. Nos. 1 to 3. American Needle and Fish-Hook Company, New Haven, Conn.
25668. Bluefish-drail. Peculiar to Harwichport, Mass. Sanford Freeman, Norwich, Mass.
25708. Bluefish-drail. Central Wharf Company, Provincetown, Mass.
25598. Bluefish-drail. J. M. K. Southwick, Newport, R. I.
25670. Bluefish-drail. Made at sea from jaw-bone of sperm-whale (*Physeter macrocephalus*). J. H. Bartlett & Son, New Bedford, Mass.

HOOKS, (including a full series of unmounted hooks, of recent and aboriginal manufacture).**Jigs and drails.**

42877. Bluefish-squid of block tin painted. U. S. Fish Commission. (C. B. & M.)
42888. Bluefish-squid of bone and German silver. U. S. Fish Commission. (C. B. & M.)
42889. Bluefish-squid of block tin. U. S. Fish Commission. (C. B. & M.)
42890. Bluefish-squid of block tin, round. “
42891. Twirling bluefish-squid of block tin. “
42892. Bluefish and Spanish mackerel squid of block tin and pearl. U. S. Fish Commission. (C. B. & M.)
42893. Bluefish and Spanish mackerel squid of pearl. U. S. Fish Commission. (C. B. & M.)
42894. Bluefish-squid of block tin, in imitation of a fish. U. S. Fish Commission. (C. B. & M.)
42895. Bluefish-squid with double hook. U. S. Fish Commission. (C. B. & M.)
25669. Bluefish-drail. Peculiar to Hyannis, Mass. Freeman Hallett, Hyannis, Mass. When used, covered with an eel-skin.
25600. Weak-fish jigs. Used in Newport, R. I. J. M. K. Southwick, Newport, R. I.
42877. Bone and metal squid for Spanish mackerel and bluefish. U. S. Fish Commission. (C. B. & M.)
42878. Pearl and tin squids and hooks for young bluefish and weakfish. U. S. Fish Commission. (C. B. & M.)
9078. Metallic squid. Indiana, Alaska. Lieut. F. W. Ring, U. S. A.
32657. Cahoon's improved trolling-hooks. (Patented March 24, 1874.) Thomas J. Gifford & Co., New Bedford, Mass.
12496. Mackerel-jigs. Cape Ann. J. P. Nason, Rockport, Mass.
32658. Mackerel-jig. Gloucester, Mass. G. Brown Goode.
29479. Mackerel-jig. John B. Parsons, Rockport, Mass.
32734. Mackerel-jigs. Used thirty years ago. A. McCurdy, Gloucester, Mass.
25599. Mackerel-jigs. J. M. K. Southwick, Newport, R. I.
25941. Mackerel-jigs. Used about the year 1840. Capt. Edward L. Rowe, Gloucester, Mass.
39174. Jig mold. Style of 1840. U. S. Fish Commission.
39171. Jig mold. Style in use at the present time. U. S. Fish Commission.
39429. Wooden jig mold. Made by fishermen. U. S. Fish Commission.
39175. Old style mackerel jigs. U. S. Fish Commission.
12495. Soapstone “jig” molds, No. 1. (Patented March 15, 1870.) Cape Ann. J. P. Nason, Rockport, Mass.
25780. Soapstone mackerel-jig mold. Capt. E. L. Rowe, Gloucester, Mass.
- 25781-2. Wooden, lead-lined, mackerel-jig molds.
25721. Mackerel-jig mold. (Patented March 15, 1870; J. P. Nason, No. 2.) Central Wharf Company, Provincetown, Mass.
32656. Mackerel-jig mold. Gloucester, Mass. G. Brown Goode.
4. Mackerel-jig ladle. “ “
- Mackerel-jig rasp. “ “
- Mackerel-jig file. “ “
- . Pewter for use in manufacture of jigs. Gloucester, Mass. G. Brown Goode.
51. Codfish “trip” and “fly-jig.” Styles used fifty years ago. Lemuel Cook, 2d, Provincetown, Mass.
- Codfish jig-hook. Used when the fish rise from the bottom. Massachusetts. A. R. Crittenden, Middletown, Conn.

HOOKS (including a full series of unmounted hooks, of recent and aboriginal manufacture).

Spoon-baits, plain and fluted.

25550. Trolling-spoons. For bass and pickerel. Bradford & Anthony, Boston, Mass.
25555. Bluefish-spoons. Bradford & Anthony, Boston, Mass.
25550. Spinners. For pickerel, trout, and bass fishing. Bradford & Anthony, Boston, Mass.
25549. Spoon-baits. For bass, pickerel, pike, and trout fishing (nickel-plated). John H. Mann, Syracuse, N. Y.
25551. Spoon-baits. For bass, pike, pickerel, and trout (silver-plated). J. T. Buel, Whitehall, N. Y.
25552. Spoon-baits. For pike, pickerel, bass, trout, and bluefish. Wm. H. James, Brooklyn, N. Y.
25553. Spoon-baits. For pike, bass, pickerel, and trout fishing. Wm. H. James, Brooklyn, N. Y.
26793. Series of fluted trolling-spoons. D. M. Skinner, Gananoque, Ontario, Canada.
42382. Spoon-baits. For bass and pickerel. U. S. Fish Commission. (C. B. & M.)
42383. Chapman's bass and pickerel baits. U. S. Fish Commission. (C. B. & M.)
42384. Revolving metal spinner. For black bass. U. S. Fish Commission. (C. B. & M.)
42385. Chapman's revolving spoon-baits. For lake trout and black bass. U. S. Fish Commission. (C. B. & M.)
42386. Lowe's revolving feathered spoon-baits. For black bass. U. S. Fish Commission. (C. B. & M.)
25554. Spoon-baits. For pike, pickerel, bass, and trout. W. D. Chapman & Son, Theresa, N. Y.
42375. Pearl-baits. For lake trout, black bass, and pickerel. U. S. Fish Commission. (C. B. & M.)
These baits are made from pearl shells, and trimmed with white ibis feathers.
25666. Pearl minnows. W. M. Young, Philadelphia, Pa.
25550. MacHarg's pearl spoons. For pickerel, trout, and bass. Bradford & Anthony, Boston, Mass.

Artificial flies on hooks.

42370. Artificial insects, 20 specimens. U. S. Fish Commission. (C. B. & M.)
These insects are manufactured from the following materials, viz:
quills, feathers, silk, wool, beads, and gut.
42376. Artificial "dobson," for black bass fishing. U. S. Fish Commission. (C. B. & M.)
32735. Bass-flies. Sara J. McBride, Mumford, N. Y.
32736. Trout-flies. " "
26105. Salmon-flies. " "
32737. Artificial flies for salmon, trout, and bass. Bradford & Anthony, Boston, Mass.

NOTE.—For convenience, this entire collection is provisionally entered under a single catalogue number.

- a. Peacock, with water-color sketch of original.
b. March Brown, with water-color sketch of original.

HOOKS (including a full series of unmounted hooks, of recent and aboriginal manufacture).**32737. Artificial flies for salmon, trout, and bass—Continued.**

Body—Fur of the fox-squirrel's face ribbed over with olive silk. **Tail**—Two strands of brown feather of the wild mallard. **Wings**—From the side feather of the shoveller duck approaching the tail; the light yeast-colored feather is the best, and, if nicely tied, must be an excellent fly. **Legs**—A grizzled cock's hackle, wound twice or thrice at the shoulder. For Pennsylvania, hooks Nos. 6 to 8; for New York, hooks Nos. 5 and 6; New England hooks Nos. 4 and 5.

- c.* Great Red Spinner, with water-color sketch of original.
- d.* Water-cricket, with water-color sketch of original.
- e.* Great Dark Drone, with water-color sketch of original.
- f.* Cow-dung.

Body—Yellow mohair mixed with a little dingy brown fur from the beam. **Wings**—From the quill-feather of the curlew or whimbrel. **Legs**—Of ginger-colored cock's hackle. For Pennsylvania, hooks Nos. 8 to 10; for New York, hook No. 8; for New England, hook No. 6.

- g.* Red Fly, with water-color sketch of original.

Body—The red part of squirrel's fur mixed with an equal quantity of claret mohair. **Wings**—The softest quill-feather of the pea-hen's wing. **Legs**—Claret-colored hackle; clip some of the upper fibers off that the wings may lie flat. For Pennsylvania, hook No. 6; for New York, hook No. 4; for New England, hook No. 3.

- h.* Blue Dun, with water-color sketch of original.

Body—Fur of a gray squirrel spun very thinly on fine yellow silk. **Tail**—Two fibers of a dun hackle. **Wings**—From a quill-feather of the blue-jay. **Legs**—Two or three turns of a ginger-dun hackle at the shoulder helps to keep the wings upright. For Pennsylvania, hook No. 6; for New York, hook No. 5; for New England, hook No. 4.

- i.* Red Spinner, with water-color sketch of original.

Body—Bright brown silk ribbed, with fine gold twist. **Tail**—Two fibers of red cock's hackle. **Wings**—Upright from a mottled gray feather of the mallard stained a pale blue, the brighter in color the better. **Legs**—Plain red cock's hackle. For Pennsylvania, hook No. 6; for New York, hook No. 5; for New England, hook No. 4.

- j.* Nicholson.
- k.* Black Dog.
- l.* Atkinson.
- m.* Policeman.
- n.* Claret Wasp.
- o.* Blue Wasp.
- p.* Wren-tail, with water-color sketch of original.

Body—Ginger-colored fur ribbed with gold twist. **Wings**—Feathers from a wren's tail; if these cannot be procured a small scapular feather of the woodcock makes a good imitation, and may be hackled with the same kind of feather. For Pennsylvania, hook No. 10; for New York, hook No. 8; for New England, hook No. 6.

- q.* Red Ant, with water-color sketch of original.

Body—Peacock's herl tied with red-brown silk. **Wings**—From the quill-feather of the blue-jay. **Legs**—A small red cock's hackle.

HOOKS (including a full series of unmounted hooks, of recent and aboriginal manufacture).

32737. Artificial flies for salmon, trout, and bass—Continued.

- r. Silver Horns, with water-color sketch of original.
- s. Golden-dun Midge, with water-color sketch of original.
- t. Sand-fly, with water-color sketch of original.
 Body—Of the sandy-colored fur from the rabbit's neck or from the fox-squirrel spun on silk of the same color. Wings—From the whimbrel wing made full. Legs—From a light-ginger feather from the neck of a hen. For Pennsylvania, hooks Nos. 6 to 8; for New York, hooks Nos. 5 and 6; for New England, hooks Nos. 4 and 5.
- u. Stone-fly, with water-color sketch of original.
 Body—Fur of the gray squirrel, when it is shortest is best, mixed with a little yellow mohair, leaving yellow about the tail. Tail—A strand or two of brown mottled feathers, say of mallard. Wings—From the soft inside feather of the pea-hen's wing. Legs—Blue-dun cock's hackle. For Pennsylvania, hooks Nos. 6 to 8; for New York, hooks Nos. 5 and 6; for New England, hooks Nos. 4 and 5.
- v. Gravel-bed, with water-color sketch of original.
 Body—Dark dun or lead-colored silk floss dressed very fine. Wings—From a covert-feather of the woodcock's wing. Legs—A black cock's hackle, rather long, wound twice only round the body. For Pennsylvania, hooks Nos. 8 to 10; for New York, hooks Nos. 6 to 8; for New England, hooks Nos. 5 and 6.
- w. Grannum, with water-color sketch of original.
 Body—Fur of a rabbit's face with a little fine green mohair worked in at the tail. Wings—From the inside wing-feather of a grouse. Legs—A pale ginger hen's hackle. For Pennsylvania, hooks Nos. 8 to 10; for New York, hooks Nos. 6 to 8; for New England, hooks Nos. 5 and 6.
- x. Yellow Dun, with water-color sketch of original.
 Body—Yellow mohair mixed with a little pale blue from a mouse or yellow floss silk with the least blue rabbit fur spun upon it. Wings—Upright, from the inside wing-feather of a mallard or summer duck. For Pennsylvania, hook No. 10; for New York, hook No. 8; for New England, hooks Nos. 5 and 6.
- y. Iron-blue Dun, with water-color sketch of original.
- z. Hawthorn, with water-color sketch of original.
 Body—Black ostrich's herl. Wings—From the quill-feather of the English snipe. Legs—A black cock's hackle. For Pennsylvania, hooks Nos. 8 to 10; for New York, hooks Nos. 6 to 8; for New England, hooks Nos. 5 and 6.
- aa. Jenny Spinner, with water-color sketch of original.
- ab. Dennison.
 Body—Green floss silk ribbed with silver twist. Tail—Orange-tipped fibres of tippet, wood-duck, ibis, and green parrot. Legs—A golden yellow hackle. Wings—Of the following kinds: wood-duck, tippet, brown mallard, bustard, green parrot, blue and yellow macaw, with a few strands of red macaw; black ostrich head. Hooks Nos. 1, 2, and 3.
- ac. Deacon.
 Body—Bright yellow seal's fur ribbed with silver tinsel backed with gold twist. Tail—Sprigs of gray mallard and ibis. Legs—Bright yellow hackle. Wings—Strips of gray mallard dressed full; black ostrich head. Hooks Nos. 2 and 3.

HOOKS (including a full series of unmounted hooks, of recent and aboriginal manufacture).

32737. Artificial flies for trout, salmon, and bass—Continued.

ad. Montreal.

Body—Claret mohair ribbed with gold tinsel. Tail—Three or four fibres of scarlet ibis. Legs—Claret hackle. Wings—Brown turkey. Hooks Nos. 1, 2, and 3.

ae. Rangely.

Body—Dark claret mohair ribbed with gold tinsel. Tail—Fibres of wood-duck and ibis. Legs—Dark claret hackle. Wing—Strips of wood-duck mixed with springs of scarlet ibis. Hooks Nos. 1, 2, and 3.

af. Tinselled Ibis.

Body—Silver tinsel ribbed with gold twist. Tail—A slip of wood-duck mixed with ibis. Legs—A covert wing-feather of the ibis. Wings—Strips from the large covert-feather of the ibis (the wing may be varied, adding a slip of wood-duck on each side); black ostrich head. Hooks Nos. 1, 2, and 3.

ag. Lake George.

Body—Gold twist ribbed with silver twist. Tail—A small China topping. Legs—A bright orange hackle with a shoulder of bright claret. Wings—Two tipped feathers mixed with argus pheasant, brown mallard; black ostrich head. Hooks Nos. 1, 2, and 3.

ah. Chateaugay.

Body—Lemon-yellow floss ribbed with gold twist. Tail—A few fibres of brown mallard. Legs—A ginger-colored cock's hackle. Wings—Strips of shoveller duck mixed with fibres of argus pheasant.

ai. Yellow Drake.

Body—Yellow mohair ribbed with silver twist. Tail—Three fibres of yellow macaw. Legs—Yellow hackle with two turns of ibis on shoulder. Wings—Strips of gray mallard; black ostrich head. Hook No. 3.

aj. Richardson.

Body—A light-blue floss silk ribbed with silver twist. Tail—Three strands of brown mallard. Legs—Black cock's hackle. Wings—Strips of English blue-jay mixed with brown mallard. Hooks Nos. 3 and 4.

ak. Anthony.

al. Snow-fly.

am. Captain.

an. Combination.

Body—First half, yellow seal's fur; second half, red-claret seal ribbed with silver tinsel (the fur to be picked out). Tail—A few fibres of gray mallard mixed with ibis. Legs—A natural red hackle dipped in yellow dye. Wings—A piece of the same kind of hackle with pale ibis strips. On each side a piece of gray mallard sufficiently large to make the wing full; black ostrich head. Hooks Nos. 1, 2, and 3.

ao. Silver Doctor.

Body—Silver tinsel ribbed with gold twist. Tail—China pheasant topping. Legs—A pale-blue hackle with a small teal or guinea-hen at the shoulder. Wings—Mixed fibres of wood-duck, brown mallard, guinea-hen, green parrot, blue macaw, teal, and bustard; black ostrich head. Hooks Nos. 2 and 3.

HOOKS (including a full series of unmounted hooks, of recent and aboriginal manufacture.)

32737. Artificial flies for salmon, trout, and bass—Continued.

ap. Prouty.

Body—First joint, silver twist; second, black ostrich with three turns of the twist over it. Tail—Orange floss with a turn or two of twist, a topping mixed with fibres of English blue-jay. Legs—A yellow dyed list hackle wound over the ostrich. Wings—Strips of white swan dyed yellow. One each side a rib of teal-feather, red macaw feelers; black ostrich head. Hooks Nos. 2 and 3.

aq. Black Cricket.

ar. Grasshopper.

as. Great Blow.

at. Cadiz.

au. Murray.

Black silk floss ribbed with silver twist. Tail—A small feather from the neck of the scarlet ibis. Legs—A golden yellow hackle. Wings—Dark mottled turkey; black ostrich head. Hooks Nos. 1 and 2.

av. Round Lake.

aw. Nameless.

Body—Brown ostrich herl, ribbed with gold twist, tag orange floss. Tail—Two or three short sprigs of yellow macaw. Legs—A small sooty orange hackle, wound from tag to shoulder. Wings—Alternate strips of brown peacock-wing feather and shoveller duck, with a sprig or two of wood-duck; peacock herl head. Hooks Nos. 1, 2, and 3.

ax. Rackette.

Is made in two joints of black orange mohair, with gold tinsel. Legs—A dyed black hackle wound from tail to head. Tail—Bright yellow toucan. Wings—A mixture of gold pheasant tail, argus, and teal. Hooks Nos. 1, 2, and 3.

ay. Priest.

az. Francis Sykes.

ba. Duke.

bb. Dhoon.

bc. Dustin.

bd. Lascelles.

be. Snitching Sandy

bf. Pronty.

bg. Grace.

bh. Powells.

bi. Hawthorne.

bj. Edmonson.

bk. Whitcher.

bl. Carshalton.

bm. Professor.

Body—Yellow mohair or silk floss, ribbed with silver twist or tinsel. Tail—Two or three strands of scarlet ibis-wing feathers. Wings—From the gray.

bn. Coughton.

bo. Alder.

bp. Chantry.

bq. Kingdom.

HOOKS (including a full series of unmounted hooks, of recent and aboriginal manufacture).

32737. Artificial flies for salmon, trout, and bass—Continued.

br. Hoflan Fancy.

bs. Coachman.

Body—Peacock's herl. Wings—From a white hen's wing-feather, or a pigeon-wing feather will answer the purpose. Legs—A red cock's hackle wound twice or thrice at the shoulder. For Pennsylvania, hooks Nos. 8 to 10; for New York, hooks Nos. 5 and 6; for New England, hooks Nos. 4 and 5.

bt. Willow.

ba. Prouty.

br. Notion.

Body—First half gold twist, remainder brown mohair, with three turns of the twist over it. Tail—A topping mixed with blue kingfisher. Legs—Brown hackle. Wings—Two tipped feathers mixed with argus pheasant, brown mallard, teal, China pheasant-tail feathers, blue and yellow macaw, with a blue kingfisher on each side of the wing; black ostrich head. Hooks Nos. 2 and 3.

bw. Louise.

Body—Brown mohair ribbed with gold twist. Tail—China feather topping. Legs—Reddish brown hackle, blue-jay on shoulder. Wings—Pheasant tippet feather and tail mixed with sprigs of green parrot, blue macaw, and kingfisher. Head—Orange mohair. Hooks Nos. 1 and 2.

bx. Round Lake.

Body—Orange and red claret merging into each other, silver tinselled. Tail—sprigs of gold pheasant tippet, blue macaw, and green parrakeet. Legs—A claret hackle with a turn or two of orange on the shoulder. Wings—Two strips of brown turkey, with a small jungle-cock's feather on each side. Hooks Nos. 1, 2, and 3.

by. Nicholson.

bs. Our Pattern.

ca. Saranac.

Body—Claret floss silk ribbed with gold tinsel, backed with silver twist. Tail—China pheasant crest-feather. Legs—A claret hackle. Wings—Two China pheasant tippet feathers on each side, a strip or two of brown mallard and argus pheasant; black ostrich head. Hooks Nos. 1-0, 2, and 3.

cb. Long Tom of Long Lake.

Body—Gray squirrel mixed with a little green mohair ribbed with silver tinsel. Tail—China pheasant crest-feather. Legs—A blue dun cock's hackle; at shoulder two or three turns of bright claret hackle. Wings—Strips of brown mallard mixed with strands of summer duck, peacock-wing, and upper coverts of the wild turkey, red macaw feelers; black plush head. Hooks Nos. 1, 2, and 3.

cc. St. Regis.

Body—Cinnamon mohair ribbed with double gold twist. Tail—A strip of China pheasant tippet mixed with a few strands of bustard. Legs—A chestnut hackle with three turns or so of orange-dyed guinea-hen, small and short in the fibres. Wings—Strips of brown mallard, brown turkey, English pheasant tail, and China tippet; black ostrich head. Hooks Nos. 1 and 2.

HOOKS (including a full series of unmounted hooks, of recent and aboriginal manufacture).

32737. Artificial flies for trout, salmon, and bass—Continued.

cd. No. 8.

Body—Three or four turns of mohair, rest of black mohair ribbed with silver tinsel and backed with gold twist. Tail—A small topping. Legs—A dyed black hackle and a shoulder of red claret. Wings—Mixed fibres of mallard, guinea-hen tail-feather over wing, two strips of dark turkey tipped with white. Hooks Nos. 2 and 3.

ce. Highlander.

cf. Lady of Mertoun.

Body—Water-rat's fur ribbed with silver twist. Tail—A tip of common ostrich or mohair and a gold pheasant topping. Legs—Two or three turns of a small red hackle finished off with a black hackle. Wings—Strips of dark gray mallard. Head—Crimson ostrich or mohair. Hooks Nos. 1-0, 1, and 2.

cg. Topyy.

Body—Black mohair ribbed with silver tinsel. Tail—A topping tip crimson. Legs—A turn or two of red hackle, the rest black hackle. Wings—Black or brown turkey tipped with white. Head—Crimson. Hooks Nos. 1-0, 1, and 2.

ch. Sapper.

Body—Orange mohair ribbed with gold tinsel. Tail—Fibres of green parrot, guinea-hen, tippet feather, and ibis. Legs—Orange hackle, shoulder a dyed black hackle. Wings—Strips of peacock-wing feather, brown mallard, green parrot, guinea-hen, gold pheasant tail, blue macaw feelers; black ostrich head. Hooks Nos. 1-0 and 1.

ci. Stephens.

Body—Brick-colored, silk ribbed with gold twist and blue tip. Tail—Gold pheasant topping. Legs—Hackle, same color as body. Wings—Gold pheasant tippet and slight mixture of mallard; black ostrich head. Hooks No. 1.

cj. Jock Scott.

Body—In two joints, gold-colored floss the lowest, and black floss the upper; from the joint are tied two short toucan points, and over the butts of them at the joints two turns of black ostrich. Tail—One gold pheasant topping and one Indian crow feather. Legs—Black hackle over the black joint and speckled guinea-hen at the shoulder. Wings—A white tip turkey, slip in the middle fibres of bustard, teal, brown mallard, yellow, red, and green parrot, one topping over all; blue macaw feelers. A kingfisher on either cheek; black ostrich head. Hooks Nos. 1-0, 1, and 2.

ck. Whitcher.

Body—Black mohair ribbed with silver, tip yellow silk. Tail—Gold pheasant topping. Legs—Black hackle. Wings—A mixture of mallard and hooded merganser; black ostrich head. Hooks Nos. 1 and 2.

cl. Nicholson.

Body—Blood-red mohair ribbed with gold tinsel. Tail—Sprigs of mallard and pheasant tippet feather. Legs—A blood-red and dark-blue hackle wound on together. Wings—Brown mallard and blue macaw feelers; black ostrich head. Hooks Nos. 1 and 2.

HOOKS (including a full series of unmounted hooks, of recent and aboriginal manufacture).

32737. Artificial flies for salmon, trout, and bass—Continued.

cm. Caribou.

Body—Tip gold tinsel, tag golden-yellow silk, next a black silk joint, the rest of gray caribou. Legs—Gray hackle with a claret on the shoulder. Tail—Gold pheasant topping. Wings—Turkey and mallard with sprigs of macaw and pheasant tippet feather; black ostrich head. Hooks Nos. 1-0, and 1.

cn. Moosee.

Body—Yellow floss ribbed with silver tinsel. Tail—A China pheasant topping. Legs—A yellow hackle; shoulder hackle a guinea-hen. Wings—Two tippet feathers of the China pheasant with fibres of mallard wood-duck on each side; black ostrich head. Hooks Nos. 1, 2, and 3.

co. Moosehead.

Body—Deep claret mohair ribbed with gold twist. Tail—A topping. Legs—A claret hackle with three turns of orange hackle at the shoulder. Wings—Strips of brown mallard and tippet feather with red macaw feelers; black ostrich head. Hooks Nos. 1, 2, and 3.

cp. Fiery-brown.

Body—Fiery brown mohair ribbed with gold tinsel. Tail—A small topping mixed with wood-duck. Legs—A brown-red hackle. Wings—Brown mallard with a little wood-duck and golden pheasant neck-feather mixed; black head. Hooks Nos. 1, 2, and 3.

cq. Parson.

cr. Gold Wing.

cs. Gold Mallard.

ct. Kireudbrightshire.

cu. Eagle.

cv. Tartan.

cw. Last Fly.

cx. Atkinson.

cy. Strachan.

cz. Parson.

Body—Black mohair tipped with orange and ribbed with silver twist. Tail—A small topping. Legs—A black hackle. Wings—Brown turkey-tail; black head. Hooks Nos. 2 and 3.

da. Ross.

Body—Cinnamon-colored floss ribbed with gold twist. Tail—Sprigs of green parrot. Legs—A furnace hackle. Wings—Brown mallard mixed with peacock herl; black ostrich head. Hooks Nos. 1-0 and 1.

db. Forsyth.

dc. Chamberlin.

dd. Green.

de. Whitcher.

df. Langrin.

dg. Emmet.

dh. Captain.

di. Major.

dj. Darling.

dk. Durham Ranger.

HOOKS (including a full series of unmounted hooks, of recent and aboriginal manufacture).**32737. Artificial flies for salmon, trout, and bass—Continued.***dl.* Goldfinch.*dm.* Britannia.*dn.* Popham.*do.* White Tip.*dp.* White Wing.*dq.* Drake Wing.*dr.* Dun Wing.*ds.* Black and Yellow.*dt.* Blue Doctor.*du.* Kate.*dv.* Ruggles.*dw.* Little yellow May Dun, with water-color sketch of original.*dx.* Oak Fly, with water-color sketch of original.

Body—Orange floss silk ribbed with ash-colored silk thread or a little floss, the ash-color to be shown well at the tail and shoulders. Wings—From a scapular feather of the woodcock. Legs—A furnace hackle or red cock's hackle with a black list up the middle. For Pennsylvania, hooks Nos. 8 to 10; for New York, hooks Nos. 6 to 8; for New England, hooks Nos. 5 and 6.

dy. Black Gnat, with water-color sketch of original.

Body—Black ostrich herl. Wings—From the quill-feather of the rice-bird or grackle. Legs—Black hackle. For Pennsylvania, hooks Nos. 10 to 12; for New York, hooks Nos. 8 to 10; for New England, hook No. 8.

dz. Fern Fly, with water-color sketch of original.

Body—Orange floss silk. Wings—From the quill-feather of the summer-duck wing; the smaller-sized hooks can be dressed from the wing-feather of the blue-jay. Legs—A red cock's hackle. For Pennsylvania, hooks Nos. 8 to 10; for New York, hooks Nos. 6 to 8; for New England, hooks Nos. 5 and 6.

ea. Yellow Sally, with water-color sketch of original.

Body—Any yellowish fur ribbed with yellow or apple-green silk. Wings—From a wing-feather of a white hen or white pigeon stained pale yellow. Legs—A white cock's hackle stained in the same dye. For Pennsylvania, hooks Nos. 6 to 8; for New York, hooks Nos. 5 and 6; for New England, hooks Nos. 4 and 5.

eb. Alder Fly, with water-color sketch of original.

Body—Peacock's herl. Wings—From a feather of a brown hen's wing. Legs—A red cock's hackle or a black cock's hackle will answer tolerably well. For Pennsylvania, hooks Nos. 8 to 10; for New York, hooks Nos. 5 and 6; for New England, hooks Nos. 4 and 5.

ec. Sky Blue, with water-color sketch of original.*ed.* Little dark Spinner, with water-color sketch of original.*ee.* Turkey Brown, with water-color sketch of original.*ef.* Magalloway.

Body—Half black ostrich and half brown mohair ribbed with gold twist. Tail—Short fibers of yellow macaw. Legs—A furnace hackle of the shoulder. Wings—Strips of brown quill-feathers of the peacock; black ostrich head. Hook No. 3.

eg. Bemis Stream.

Body—Chestnut mohair ribbed with gold tinsel. Tail—China pheasant topping. Legs—A chestnut hackle. Wings—Strips of brown peacock mixed with bustard. Hooks Nos. 1 and 2.

HOOKS (including a full series of unmounted hooks, of recent and aboriginal manufacture).**32737. Artificial flies for salmon, trout, and bass—Continued.****ek. Mooselocmaguntick.**

Body—About equal parts mixed of gray squirrel's fur and pea-green mohair ribbed with gold twist. Tail—Four strands of argus feathers. Legs—A brown bittern hackle. Wings—Gray speckled turkey, white tipped (dyed yellow), with a strip of argus feather on each side; green ostrich head. Hook No. 1.

el. Molechunkemunk.

Body—Orange floss silk ribbed with gold tinsel, backed with silver twist. Tail—China pheasant topping. Legs—A furnace hackle. Wings—Brown mallard; black ostrich head.

ej. Willow Finch.

Body—Yellow seal's fur ribbed with silver twist. Tail—Sprigs of tippet feathers mixed with yellow macaw. Legs—A yellow hackle, at the shoulder a small guinea-hen stained yellow. Wings—Strips of swan feather dyed yellow with a spray of guinea-hen (tail-feather) dyed yellow; black ostrich head. Hooks Nos. 1, 2, and 3.

ek. Oquassac.

Body—Red claret mohair ribbed with pink floss. Tail—Yellow tag with pieces of argus and tippet feathers. Legs—A claret hackle. Wings—Strips from the quill-feather of the argus pheasant; black ostrich head. Hooks Nos. 1-0 and 1.

el. Welokennebago.

Body—Red pig's hair ribbed with broad gold tinsel, backed with silver twist. Tail—A mixture of black turkey tipped with white and scarlet ibis. Legs—Scarlet hackle. Wings—Fibers of red macaw mixed with strips of black and brown turkey tipped with white; black ostrich head.

em. Copsuptuc.

Body—Silver tinsel ribbed with gold twist. Tail—Fibers of China pheasant tail mixed with guinea-hen and red macaw. Legs—A brilliant scarlet hackle. Wings—Mixed and to be made full. Two strips of brown turkey tipped with white-brown mallard, China pheasant tail and guinea-hen; black ostrich head. Hooks Nos. 1-0, 1, and 2.

en. Orange Grouse.**eo. Thunder and Lightning.****ep. Lough Gill.****eq. Lillie.****er. Black Ant.****es. Blue Blow.****et. Mare.****eu. Hare's Ear.****ev. Ibis.****ew. Seth Green.****ex. Red Creeper.****ey. Turkey Brown.****ez. Queen of the Waters.****fa. Governor.****fb. White Miller.****fc. Lion.**

HOOKS (including a full series of unmounted hooks, of recent and aboriginal manufacture).

32737. Artificial flies for salmon, trout, and bass—Continued.

fd. Water-witch.

fe. Atkinson.

ff. Our Own Pattern.

fg. Green Drake, with water-color sketch of original.

Body—Pale straw-colored floss silk ribbed with brown silk thread or floss; the extremities are of brown peacock's herl. Tail—Three rabbit's whiskers. Wings—Made from a mottled feather of mallard stained a pale yellowish-green. Legs—A grizzled cock's hackle stained a yellowish-green in the same dye. For Pennsylvania, hooks Nos. 6 to 8; for New York, hooks Nos. 4 to 6; for New England, hooks Nos. 3 and 4.

fh. Gray Drake, with water-color sketch of original.

Body—The middle part of white floss silk ribbed with silver twist; the extremities of brown peacock's herl. Tail—Three rabbit's whiskers. Wings—Made from a gray mottled feather of the mallard. Size of hooks same as green drake.

fi. Orange Dun, with water-color sketch of original.

This fly is equally attractive to trout, and is a prime favorite in its day—the end of June, July, and August. Body—Dark orange silk. Tail—Two fibers of brown mallard feather. Wings—From the quill-feather of the large red-crowned woodpecker. For Pennsylvania, hooks Nos. 6 to 8; for New York, hook No. 6; for New England, hooks Nos. 5 and 6.

fj. Green Mackerel, with water-color sketch of original.

fk. Brown Mackerel, with water-color sketch of original.

fl. Marlow Buzz, with water-color sketch of original.

fm. Pale Evening Dun, with water-color sketch of original.

fn. July Dun, with water-color sketch of original.

Body—Mole's fur and pale-yellow mohair mixed and spun on yellow silk. Tail—Two or three whiskers of a dark dun hackle. Wings—From the quill-feather of a blue-jay. Legs—Dark dun hackle. For Pennsylvania, hooks Nos. 8 to 10; for New York, hooks Nos. 6 to 8; for New England, hooks Nos. 5 and 6.

fo. Gold-eyed Gauge-wing, with water-color sketch of original.

fp. Butcher, No. 1.

fq. Blue Ranger.

fr. Black Ranger.

fs. Colonel.

ft. Children's Farlow.

fu. Candlestick Maker.

fv. Baker.

fw. Butcher.

fx. Namsen.

fy. Black and Teal.

fz. Guinea Hen.

ga. Claret.

gb. Inquichin.

gc. Maxwell Ranger.

gd. August Dun, with water-color sketch of original.

Body—Brown floss silk, ribbed with yellow silk thread. Tail—Two rabbit's whiskers. Wings—Feather of a brown hen's wing. Legs—A dark red hackle. For Pennsylvania, hook No. 8; for New York, hook No. 6; for New England, hook No. 5.

HOOKS (including a full series of unmounted hooks, of recent and aboriginal manufacture).

32737. Artificial flies for salmon, trout, and bass—Continued.

ge. Orange, with water-color sketch of original.

Body—Orange floss silk, ribbed with black silk. Wings—Dark part of the blue-jay's wing. Legs—A very dark furnace hackle. For Pennsylvania, hooks Nos. 8 to 10; for New York, hooks Nos. 6 to 8; for New England, hook No. 6.

gf. Cinnamon, with water-color sketch of original.

Body—Fawn-colored floss silk, ribbed with red silk thread. Wings—Feather of a yellow-brown hen's wing. Legs—A ginger hackle. For Pennsylvania, hook No. 8; for New York, hook No. 6; for New England, hook No. 6.

gg. Blue-bottle, with water-color sketch of original.

Body—Bright blue floss silk, with a few turns of brown floss at the shoulder. Wings—From the quill-feather of a water-hen. Legs—Black hackle from a cock, wrapped down the principal part of the body. For Pennsylvania, hook No. 8; for New York, hook No. 6; for New England, hook No. 5.

gh. Whirling-blue Dun, with water-color sketch of original.

Body—Squirrel's red-brown fur mixed with yellow mohair. Tail—One or two whisks of a pale ginger hackle. Wings—From the quill-feather of a mallard. For Pennsylvania, hook No. 8; for New York, hook No. 8; for New England, hook No. 6.

42867. Salmon flies. Manufactured by Conroy, Bisset & Malleson, New York. U. S. Fish Commission.

- a.* Halifax.
- b.* Curtis.
- c.* Blue Sandy.
- d.* Fairy.
- e.* Unknown.
- f.* Sapper.
- g.* Silver Grey.
- h.* Jock Scott.
- i.* Claret Body.
- j.* Fancy Yellow.
- k.* Butcher.
- l.* Popham.
- m.* Silver Doctor.
- n.* Red Blue.
- o.* Fiery Brown.
- p.* Claret Fairy.
- q.* Unknown.
- r.* Silver Doctor.
- s.* Prouty.
- t.* Jock Scott.
- u.* Red Robin.
- v.* Black Robin.
- w.* Donkey.
- x.* Dark Claret.

HOOKS (including a full series of unmounted hooks, of recent and aboriginal manufacture.).

42868. Lake flies. Manufactured by Conroy, Bissett & Malleson, New York. U. S. Fish Commission. (C. B. & M.)

- a. Blue Dun.
- b. Professor.
- c. Grizzly King.
- d. Scarlet Ibis.
- e. Golden Pheasant.
- f. Grizzly Hackle.
- g. Coachman.
- h. Black Moose.
- i. Jungle Cock.
- j. Brown Hackle.
- k. Cow Dung.
- l. Yellow Sally.
- m. Yellow Moose.
- n. Turkey.
- o. Saranac.
- p. Black Fly.
- q. White Miller.
- r. White Miller (fall wings).
- s. Cow Dung.
- t. Black Hackle.
- u. Silver Doctor.
- v. Fiery Yellow.
- w. March Brown.
- x. Abbey.
- y. Yellow Body Moth.

2869. Bass flies, used for the black bass (*Micropterus pallidus*). Manufactured by Conroy, Bissett & Malleson. U. S. Fish Commission. (C. B. & M.)

- a. Scarlet Ibis.
- b. Black Fly.
- c. Mealy Mouth.
- d. Turkey Brown.
- e. Yellow Ferguson.
- f. Page.
- g. Holberton's Humble Bee.
- h. Cape Vincent.
- i. Holberton.
- j. Ferguson.
- k. White Miller.
- l. Yellow Bee.
- m. St. Lawrence.
- n. Grizzly King.
- o. Mallard.
- p. Scarlet Moth.
- q. Scarlet Moth, No. 2.
- r. Mallard.

HOOKS (including a full series of unmounted hooks, of recent and aboriginal manufacture).

42871. Trout and grayling flies. Manufactured by Conroy, Bissett & Malleson, New York. U. S. Fish Commission. (C. B. & M.)

- a. Professor.
- b. Grizzly Hackle, or Palmer.
- c. Grey Drake.
- d. Yellow Sally.
- e. Black Gnat.
- f. Red Hackle, or Palmer.
- g. Scarlet Ibis.
- h. Brown Hackle, or Palmer.
- i. Grizzly King.
- j. Black Fly.
- k. Blue Blow.
- l. White Miller.
- m. Olive Gnat.
- n. Green Body Black Fly.
- o. March Brown.
- p. Scarlet Body Black Fly.
- q. Great Dun.
- r. Claret Gnat.
- s. Jungle Cock.
- t. Golden Spinner.
- u. Cock-Y.
- v. Beaverkill.
- w. Grouse Hackle.
- x. Abbey or Jew Fly.
- y. Yellow Jungle Cock.
- z. Ginger Hackle.
- aa. Cowdung.
- ab. Yellow May Fly or Green Drake.
- ac. Coachman.
- ad. Canada.
- ae. Shoemaker.
- af. Red Spinner.
- ag. Blue Dun.
- ah. Queen of the Water.
- ai. Black Hackles, or Palmer.
- ai. Willow, with water-color sketch of original.
 Body—Mole's fur mixed with a little fine yellow mohair. Wings—From the quill-feather of a water-hen or coot. Legs—A dark dun hen's hackle. For Pennsylvania, hooks Nos. 8 to 10; for New York, hook No. 8; for New England, hooks Nos. 5 and 6.
- aj. Snowy.
- ak. Beauty Snow.
- al. Red Palmer, with water-color sketch of original.
 Body—Red mohair ribbed with gold twist or tinsel. Legs—A blood-red cock's (saddle) hackle wrapped nicely over it, working the hackle closely together at the shoulder. For Pennsylvania, hooks Nos. 6, 8, and 10; for New York, hooks Nos. 4, 5, and 6; for New England, hooks Nos. 3, 4, and 5.
- am. Black and Red Palmer, with water-color sketch of original.
- an. Brown Palmer, with water-color sketch of original.

HOOKS (including a full series of unmounted hooks, of recent and aboriginal manufacture).

42871. Trout and grayling flies—Continued.

- ao. Furnace.
- ap. Grizzle.
- aq. Ginger.
- ar. List.
- as. Soldier.
- at. White.
- au. Grizzle Peacock.
- av. Red.
- aw. Black Peacock.
- ax. Black.
- ay. Brown Peacock.
- az. Scarlet.

39248. 2 "Holt Patent Fly Books," one with cover, one without. Manufactured by Abbey & Imbrie. U. S. Fish Commission. (A. & I.)

39249. "Perfection Expanding Pocket Tackle Book." U. S. Fish Commission. (A. & I.)

39254. Fly books containing salmon, black bass, shad, grayling, and trout flies. Manufactured by Abbey & Imbrie, New York. U. S. Fish Commission. (A. & I.)

25548. Salmon fly-book for carrying artificial flies.

25547. Trout fly-book for carrying artificial flies. Lent by Bradford & Anthony, Boston, Mass.

39208. Holberton fly-book. For salmon flies. U. S. Fish Commission. (C. B. & M.)

39209. Holberton full-length fly-book. (Capacity, 8 dozen flies.) U. S. Fish Commission. (C. B. & M.)

39210. Holberton full-length fly-book. (Capacity, 6 dozen flies.) U. S. Fish Commission. (C. B. & M.)

39211. Holberton full-length fly-book. (Capacity, 3 dozen flies.) U. S. Fish Commission. (C. B. & M.)

All the Holberton fly-books mentioned above are intended to hold gut at full length, and are furnished with the improved "Hyde clips" for keeping the flies in place.

39212. Snell-book with changeable pockets. U. S. Fish Commission. (C. B. & M.)

This snell-book is of new style, and is very convenient for carrying a variety of flies.

39247. "Southside Fly-Book," with Abbey & Imbrie's patent clip for holding flies at full length. 7½ inches long. U. S. Fish Commission. (A. & I.)

39316. Imitation "Southside Fly-Book." 8 inches long. U. S. Fish Commission. (A. & I.)

39317. Imitation "Southside Fly-Book." 6 inches long. U. S. Fish Commission. (A. & I.)

LINES.

Silk lines.

25633. Series of braided raw-silk lines. (50 yards; C to G.) G. H. Mansfield & Co., Canton, Mass.

LINES.

Silk-lines—Continued.

25632. Oiled, braided, raw-silk lines. G. H. Mansfield & Co., Canton, Mass.
 25628. XXXX silk fish-line. (50 yards.) “
 25629. XX silk fish-line. (50 yards.) “
 25634. Grass lines. Nos. 0, 1, and 3 cable, and 3 shroud. Bradford & Anthony, Boston, Mass.
 25635. Braided grass lines. Bradford & Anthony, Boston, Mass.
 42766. Waterproof tapered braided silk line for salmon (10). (120 yards.) U. S. Fish Commission. (C. B. & M.)
 42774. Waterproof silk line for grilse (10). (100 yards.) U. S. Fish Commission. (C. B. & M.)
 42775. Waterproof silk line for black bass (8). (50 yards.) U. S. Fish Commission. (C. B. & M.)
 42776. Waterproof silk line for trout. (30 yards.) U. S. Fish Commission. (C. B. & M.)
 42767. Oiled-silk black-bass line. (100 yards.) U. S. Fish Commission. (C. B. & M.)
 42777. Oiled-silk trout-line. (100 yards.) U. S. Fish Commission. (C. B. & M.)
 42778. Raw-silk line, heavy. (50 yards.) U. S. Fish Commission. (C. B. & M.)
 42769. Raw-silk line, light. (50 yards.) U. S. Fish Commission. (C. B. & M.)
 42765. Braided silk line, heavy. (50 yards.) U. S. Fish Commission. (C. B. & M.)
 42779. Braided silk line, light. (50 yards.) U. S. Fish Commission. (C. B. & M.)
 39250. Waterproof banded tapered silk line, No. 4. (40 yards.) U. S. Fish Commission. (A. & I.)
 39251. Waterproof banded tapered silk line. (50 yards.) U. S. Fish Commission. (A. & I.)
 39252. Waterproof banded tapered silk line, No. 3. (80 yards.) U. S. Fish Commission. (A. & I.)
 39253. Waterproof banded tapered silk line. (100 yards.) U. S. Fish Commission. (A. & I.)

Linen lines.

25626. Hard-braid linen lines. (1 to 5; 50 yards each.) G. H. Mansfield & Co., Canton, Mass.
 25631. Series of braided linen fish-lines. (50 yards.) G. H. Mansfield & Co., Canton, Mass.
 25612. Linen fish-lines. J. & S. Allen, Walpole, Mass.
 25613. Linen fish-lines. “
 25618. Linen fish-lines. “
 25637. Linen bass-line. (600 feet.) Bradford & Anthony, Boston, Mass.
 42780. Braided linen line, No. 3. (50 yards.) U. S. Fish Commission. (C. B. & M.)
 42781. Braided linen line, b. (50 yards.) U. S. Fish Commission. (C. B. & M.)
 42768. Special extra quality flax reel-lines. 9-thread. (200 yards.) U. S. Fish Commission. (C. B. & M.)
 Made of the best Irish flax, spun especially for the purpose.
 42764. Special extra quality flax reel-lines. 12-thread. (200 yards.) U. S. Fish Commission. (C. B. & M.)

LINES.

Cotton lines.

25619. Cotton fish-lines. (20 feet hank.) L. Crandall & Co., Ashaway, R. I.
 25620. Cotton fish-lines. (50 feet shroud, laid.) “
 25621. Cotton fish-lines. (28-fathom hawser.) “
 25622. Cotton fish-lines. (14-fathom hawser.) “
 42770. Cotton line, No. 3. (84 feet hawser, laid.) U. S. Fish Commission.
 (C. B. & M.)
 42771. Cotton line, No. 6. (84 feet hawser, laid.) U. S. Fish Commission.
 (C. B. & M.)
 42763. Cotton line, No. 10. (84 feet hawser, laid.) U. S. Fish Commission.
 (C. B. & M.)
 42772. Linen line, No. 3. (84 feet hawser, laid.) U. S. Fish Commission.
 (C. B. & M.)
 42773. Linen line, No. 6. (84 feet hawser, laid.) U. S. Fish Commission.
 (C. B. & M.)
 25624. Tarred cotton fishing-lines. (25-fathom shroud.) L. Crandall &
 Co., Ashaway, R. I.
 25623. Cotton fishing-lines. (50 feet shroud, laid.) L. Crandall & Co.,
 Ashaway, R. I.
 26016. Golden-mackerel lines of assorted sizes. Made of pure Sea-Island
 cotton. J. W. Dresser, Castine, Me.
 25625. Braided cotton fishing-lines. G. H. Mansfield & Co., Canton, Mass.
 660. Fishing-line. Northwest coast of America. G. Gibbs.

Whalebone lines.

2193. Whalebone fish-line. Anderson River Indians. Anderson River.
 R. MacFarlane.
 2197. Whalebone line with hooks. Eskimo. Anderson River. R. Mac-
 Farlane.

Hide lines.

8787. Fishing-line made of seal-skin. Mahlemut Eskimo. W. H. Dall.
 8785. Fishing-line made of seal-skin. Kaviakemut Eskimo. Grantley
 Harbor, Alaska. W. H. Dall.
 16314. Harpoon-line. Nunivak Island, Alaska. W. H. Dall.
 15617. Harpoon-line. Made of skin of young walrus. Alaska. H. W.
 Elliott.
 19376. Harpoon-line made of seal-skin. Rev. James Curley.
 13142. Raw walrus-hide line.

Bark lines.

20655. Fishing-line made of cedar bark. Bella Bella, B. C. J. G. Swan.

Kelp lines.

656. Fishing-lines of sea-weed. (*Nereocystis luteana*.) Northwest coast
 of America. G. Gibbs.
 6561. Fish-line of kelp. (*Nereocystis luteana*.) With halibut-hooks.
 Haidah Indians. Prince of Wales Archipelago. Dr. T. T. Minor.

SNOODS, LEADERS, AND TRACES.

"Cat-gut" (sheep) snoods and leaders.

42872. Gut leaders. U. S. Fish Commission. (C. B. & M.)
- a. Twisted gut leader for salmon. (9 feet long.)
 - b. Double and twisted gut leader. (9 feet long.)
 - c. Single and twisted gut leader. (9 feet long.)
 - d. Double gut leader for bass. (9 feet long.)
 - e. Single gut leader for trout. (9 feet long.)
 - f. Single gut leader for salmon. (9 feet long.)
 - g. Single gut leader for trout. (6 feet long.)
 - h. Single gut leader for trout. (3 feet long.)
 - i. Single gut leader for trout. Extra fine. (9 feet long.)
 - j. Double gut leader for bass. (3 feet long.)
 - k. Treble gut leader for bass. (3 feet long.)
 - l. Double gut leader for bass. (6 feet long.)

Gimp gut.

39451. Samples for snells and leaders of fish-lines. F. Foster, New York, through B & A.
39452. The same in water to show its transparency. F. Foster & Co.

Silkworm-gut snoods, flax snoods, gimp snoods, wire snoods, and hooks mounted on leaders.

42873. "Snelled" hooks, or hook mounted on leaders. U. S. Fish Commission.
- a. Carlisle Kirby hooks for bluefish and pickerel. (Tied to gimp.)
 - b. Carlisle Kirby hooks for bass. (Tied to double gut.)
 - c. Limerick hooks for pickerel. (Tied to gimp.)
 - d. Kinsey hooks for bass. (Tied to double gut.)
 - e. "Forged" O'Shaughnessy hooks. (Tied to double gut.)
 - f. Limerick hooks for bass. (Tied to double gut.)
 - g. Limerick hooks for perch. (Tied to double gut.)
25540. Kinsey trout-hooks. (Tied to gut.) Bradford & Anthony, Boston, Mass.
25542. Aberdeen hooks. (Tied to gut.) Bradford & Anthony, Boston, Mass.
25543. Hollow-point Limerick hooks. (Tied to double gut.) B. & A.
25544. Hollow-point Limerick hooks. (Tied to twisted gut.) B. & A.
25545. Hollow-point Limerick hooks. (Tied to gimp.) B. & A.
25546. Carlisle hooks. (Tied to gimp.) B. & A.
25539. Hollow-point Limerick trout-hooks. (Tied to gut.) B. & A.
25541. New York bass-hooks. (Tied to gut.) B. & A.
42881. Bluefish hook mounted on piano wire. U. S. Fish Commission. (C. B. & M.)
42896. Bluefish hooks on brass snells. U. S. Fish Commission. (C. B. & M.)

SINKERS.

Line-sinkers.

39428. Sinkers and swivels. For fishing-lines. Bradford & Anthony, Boston, Mass.
25605. Series of sinkers used in fishing for cod and tautog. Newport models. J. M. K. Southwick, Newport, R. I.

SINKERS.

39428. Patent adjustable floats and sinkers. Bradford & Anthony.
 25607. Hand-line sinkers. Rhode Island and Eastern Connecticut. A. R. Crittenden.
 29456. Cod-lead mold. Used to make form in molding. John B. Parsons, Rockport, Mass.
 15591. Sinker made of walrus ivory. Poroook Eskimos, Alaska. H. W. Elliott.

Net-sinkers.

29393. Net-rings or sinkers. Wilcox, Crittenden & Co., Middletown, Conn.
 22229. Purse-net ring and thimble. Wilcox, Crittenden & Co., Middletown, Conn.

SWIVELS.

25798. Horn cod-line swivel. Much used in olden time by Grand and George's Banks fishermen. George B. Foster, Beverly, Mass.
 25945. Cod-line swivel. Central Wharf Company, Gloucester, Mass.
 26017. Cod-line gänge-swivel. A. R. Crittenden, Middletown, Conn.
 25944-6. Patent gänge-swivel. Used in cod-fishing. Central Wharf Company, Gloucester, Mass.
 29487. Haddock-gänge swivel. Showing mode of fastening. Lemuel Cook, 2d, Provincetown, Mass.
 32713. Buoy-swivel (new style). A. Voss, Gloucester, Mass.
 32694. Buoy-swivel (old style). To prevent the buoy-line from twisting. Gloucester. U. S. Fish Commission.
 25942. Halibut-gänge. Showing mode of fastening on the hook. A. R. Crittenden.
 29457. Shark-hook swivel. Wilcox, Crittenden & Co., Middletown, Conn.
 29395. Primitive trawl-buoy swivels. George B. Foster, Beverly, Mass.
 29476. Halibut trawl-buoy swivel. Used by the George's Banks fishermen. Amasa Taylor, Provincetown, Mass.
 29498. Trawl-buoy swivels. Alex. McCurdy, East Gloucester, Mass.
 25187. Trawl-buoy rope swivel. Wilcox, Crittenden & Co., Middletown, Conn.
 25946. Trawl-buoy rope swivel. Central Wharf Company, Provincetown, Mass.
 32659. Patent hawse-swivel, for George's fishing. U. S. Fish Commission.
 39178. Old style horn swivel, made in 1800. U. S. Fish Commission.
 39179. Old style wooden swivel. U. S. Fish Commission.

BOATS.

Line-floats of wood, cork, and quill.

25661. Egg-shaped floats. Wm. M. Young, Philadelphia, Penn.
 25662. Barrel-shaped floats. " "
 42874. Egg-shaped floats. U. S. Fish Commission. (C. B. & M.)
 42874. Barrel-shaped floats. " "

Harpoon-floats of bladder, inflated skin, and wood.

20898. Seal-skin buoy. Sitka, Alaska. J. G. Swan.
 19515. Seal-skin buoy. North Greenland. G. Y. Nickerson.
 827, 4970. Seal-skin buoy with rope. Makah Indians. Neeah Bay, Puget Sound, W. T. J. G. Swan.

FLOATS.

Keg and other floats for lobster-pots, gill-nets, &c.

Whale-line drag.

25914. Whale-line drag. Attached to the line and thrown overboard to check the speed of the whale.

REELS.

Simple reels for flying fish, with and without check.

42813. Salmon click-reel. Hard rubber and German silver. German-silver band. Rubber sliding-drag. U. S. Fish Commission.
42814. Grilse click-reel. Rubber and German silver. Rubber band.
42818. German-silver and rubber click-reel for black bass. German-silver band. (Capacity, 50 yards.) U. S. Fish Commission.
42820. Rubber click-reel for trout. U. S. Fish Commission. (C. B. & M.)
42822. German-silver secret click-reel. (Capacity, 40 yards.) C. B. & M.)
42823. German-silver, capped, click-reel. (Capacity, 40 yards.) C. B. & M.)
42825. Rubber and brass click-reel. U. S. Fish Commission. (C. B. & M.)
42826. Iron-reel. U. S. Fish Commission. (C. B. & M.)
- This reel is exhibited in contrast with No. 42813. The difference in value between these two reels is as 1 to 60.
25590. Brass fishing-reel. Plain, single, with ring. Bradford & Anthony, Boston, Mass.
25589. Brass fishing-reel. Plain, single, with plate. Bradford & Anthony, Boston, Mass.
25587. Brass fishing-reel. Plain, single, with stop and ring. Bradford & Anthony, Boston, Mass.
25588. Brass fishing-reel. Plain, single, with stop and plate. Bradford & Anthony, Boston, Mass.
25577. Hard-rubber fishing-reel, German-silver band. Rim very narrow, with leather case. Bradford & Anthony, Boston, Mass.
25568. Hard-rubber salmon-fishing reel. German-silver rim. Bradford & Anthony, Boston, Mass.
25581. Rubber trout-reel. (Fowler's patent.) B. & A. Boston, Mass.
25582. Orvis' patent fishing-reel. German silver, nicked and perforated. Bradford & Anthony, Boston, Mass.
25567. Fine click brass fishing-reel. (25 yards.) Bradford & Anthony, Boston, Mass.
25586. Brass fishing-reel. Click, with plate. B. & A., Boston, Mass.
25585. Brass fishing-reel. Click, with ring. B. & A., Boston, Mass.
25575. German-silver trout-fishing reel. Click, with rim. Bradford & Anthony, Boston, Mass.
25565. German-silver trout click fishing-reel. (150 yards.) Bradford & Anthony, Boston, Mass.
25569. Hard-rubber trout-fishing reel. Click, German-silver rim.
25571. Hard-rubber trout-fishing reel. Click, plain rim. Bradford & Anthony, Boston, Mass.
39245. Hard-rubber salmon-reel. U. S. Fish Commission. (A. & I.)
39431. Large ebonite trout-reel. Manufactured by Philbrook & Paine. Bradford & Anthony, Boston, Mass.
39432. Small ebonite trout-reel. Manufactured by Philbrook & Paine. Bradford & Anthony, Boston, Mass.
39430. Ebonite grilse-reel. Manufactured by Philbrook & Paine. Bradford & Anthony, Boston, Mass.

EELS.

Simple reels for flying fish, with and without check—Continued.

25579. Celluloid trout click fishing-reel. Bradford & Anthony, Boston, Mass.
 25564. German-silver salmon-fishing reel, click. (4½ inch.) Bradford & Anthony, Boston, Mass.
 39236. Frankfort reel with balance handle. B. C. Milam, Frankfort, Ky.
 25566. Reel.

Multiplying reels for bass fishing, with and without check.

25574. German-silver fishing-reel. Multiplying; 25 yards. Bradford & Anthony, Boston, Mass.
 25570. Hard rubber trout-fishing reel. Multiplying; 60 yards. Bradford & Anthony, Boston, Mass.
 25584. Brass fishing-reel. Multiplying stop and plate. Bradford & Anthony, Boston, Mass.
 25573. Brass fishing-reel. Multiplying drag; 60 yards. Bradford & Anthony, Boston, Mass.
 25572. German-silver fishing-reel. Steel pivot, multiplying drag, 300 yards. Bradford & Anthony, Boston, Mass.
 25578. Celluloid fishing-reel. With multiplying click and extra spool. Bradford & Anthony, Boston, Mass.
 39246. Hard rubber black bass, duplex, multiplying spinning reel, with adjustable click, cup center, anti-friction action. Imbrie pattern; in case. U. S. Fish Commission. (A. & I.)
 25580. Celluloid fishing-reel. Multiplying and click. Bradford & Anthony Boston, Mass.
 25583. Brass fishing-reel. Multiplying, stop and ring. Bradford & Anthony, Boston, Mass.
 42827. Winan's and Whistler patent striped-bass reel. Rubber and brass. Silver plated, complete with line. U. S. Fish Commission.
 25880. Brass reel. (C. B. & M.)
 42815. Rubber and German-silver reel. With steel pivot and balance handle. Multiplying. U. S. Fish Commission. (C. B. & M.)
 42816. German silver steel pivot-reel. With balance handle. Multiplying. U. S. Fish Commission. (C. B. & M.)
 42817. German silver reel. With balance handle. Multiplying. U. S. Fish Commission. (C. B. & M.)
 42819. Brass reel. With balance handle. Multiplying. U. S. Fish Commission. (C. B. & M.)
 42821. Rubber reel. With German-silver band. For black bass. With multiplying, click, and drag attachment. U. S. Fish Commission, (C. B. & M.)
 42824. Quadruple, multiplying, nickel-plated reel. With balance handles. U. S. Fish Commission. (C. B. & M.)

UNWALE-WINCHES.

Trawl-line rollers.

39172. Trawl-roller used in 1870. U. S. Fish Commission.
 29432. Trawl-roller or hauler. Provincetown style. Andrew Kennedy, Provincetown, Mass.
 29434. Trawl-roller or hauler. Cape Ann style. Samuel Elwell, jr., Gloucester, Mass.

GUNWALE-WINCHES.

Trawl-line rollers—Continued.

29488. Trawl-roller and eye-plate. First used by Provincetown fishermen. Amasa Taylor, Provincetown, Mass.
29445. Improved trawl-roller and socket. Amasa Taylor, Provincetown, Mass.
25767. Trawl-roller. Used to haul in trawls over the sides of dory. Allen L. McDonald, Gloucester, Mass.
39476. Trawl-winch. Gloucester, Mass. G. Brown Goodé.
29420. Line-roller. Used on whale-boats. Wm. M. Smith, Provincetown, Mass.
32712. Patent trawl-winch for hauling in trawls. A. Voss. Gloucester, Mass.

LINE-HOLDERS.

Whaleman's line-tub.

25009. Harpoon-line and tub. Used in whale-boat. J. H. Thomson, New Bedford, Mass.

Tub for trawl-line. (See under Trawl.)

Line winder.

- Line winder. "N. Swift's." Bradford & Anthony.

Spools.

25592. Crab-line reel. Used in Newport, R. I. J. M. K. Southwick, Newport, R. I.

RODS.

25511. Common rod. Three pieces; ash and hornbeam; brass mounting. Bradford & Anthony, Boston, Mass.
25501. General fishing-rod. Nine pieces; German-silver mounting. Bradford & Anthony, Boston, Mass.
25500. General fishing-rod. Six pieces; ash and lancewood; German-silver mounting. Bradford & Anthony, Boston, Mass.
25512. Gudgeon-rod. Three pieces; ash and hornbeam; brass mounting; common. Bradford & Anthony, Boston, Mass.
25510. Common pickerel-rod. Four pieces. Bradford & Anthony, Boston, Mass.
25509. Bait-rod for trout. Four pieces; common. Bradford & Anthony, Boston, Mass.
25513. Jointed rod. Four joints, extra tips, tie guides; made of Calcutta bamboo; full mounted in brass. Bradford & Anthony, Boston, Mass.
25508. Common bass-rod. Four pieces; brass mounted. Bradford & Anthony, Boston, Mass.
25498. Light bass-rod. Four pieces; extra top; ash and lancewood; German-silver mounting. Bradford & Anthony, Boston, Mass.
25497. Bass-rod. Four pieces and extra top for sea-fishing; ash and lancewood; German-silver mounting; jeweled tip. Bradford & Anthony, Boston, Mass.
25496. Sea-bass rod. Ash butt joint, bamboo middle joint, lancewood stock; double guides, jeweled; German-silver mounting; jeweled tips. Bradford & Anthony, Boston, Mass.
39249. Double-guided bass-rod, with reversible reel-plate. (Chubb's patent.) Bradford & Anthony, Boston, Mass.

RODS.

25499. Black-bass rod. Four pieces and two extra tops; split bamboo; German-silver mounting. Bradford & Anthony, Boston, Mass.
25502. Fly-rod. Three pieces and extra top; cedar and split bamboo. Bradford & Anthony, Boston, Mass.
25504. Fly-rod. Three pieces and extra top; extra middle joint; bamboo tip case; ash and lancewood; German-silver mounting. Bradford & Anthony, Boston, Mass.
25505. Fly-rod. Four pieces and extra top; ash and lancewood; German-silver mounting. Bradford & Anthony, Boston, Mass.
25503. Fly-rod for trout. Three pieces and extra top; split bamboo; German-silver mounting. Bradford & Anthony, Boston, Mass.
25506. Trout-rod. Four pieces and extra top; ash and lancewood; German-silver mounting; agate-lined tips. Bradford & Anthony, Boston, Mass.
25507. Salmon-rod. Four pieces and extra tops; bamboo top-case; ash and lancewood; German-silver mounting. Bradford & Anthony, Boston, Mass.
25887. The "Cold Brook," hollow, fly-rod. (Patented June 22, 1875.) J. L. Graves, Springfield, Mass.
25886. The "Cold Brook," hollow, salmon, bass, and angling rod. Nickel-plated, with reel showing an attached line working. (Patented June 22, 1875.) J. L. Graves, Springfield, Mass.

The following are the advantages claimed by Mr. Graves for his new rods:

1. The line is concealed and cannot be caught in underbrush or branches.
 2. The strain on the rod is equalized through the entire length.
 3. There is no friction through rings or guides except on the tip.
 4. The strength of the rod is greatly increased.
 5. The weight of the rod is diminished.
 6. The wet line is not reeled up to decay.
 7. The rod goes under the brush where the big trout lie.
 8. It adds greatly to the comfort and pleasure of the 'gentle art.'
25884. Piece of bamboo. Showing splitting process in construction of rods. H. L. Leonard, Bangor, Me.
25491. Chapman's combination trolling-pole, harpoon-line holder and cane. W. D. Chapman, Theresa, N. Y.
42782. Six-strip hexagonal split bamboo salmon-fly rod; German-silver mountings; metal reel-plate. (C. B. & M.)
- These rods are made by cementing together six triangular strips from the lower sections of the best bamboo cane.
42783. Six-strip hexagonal split bamboo Grilse fly-rod, German-silver mountings; metal reel-seat. U. S. Fish Commission. (C. B. & M.)
39242. Six-strip split bamboo light trout-fly rod. U. S. Fish Commission. (A. & I.)
42784. Four-piece ash and lancewood salmon-rod, with duplicate joint and 3 tips; bamboo tip-case. U. S. Fish Commission. (C. B. & M.)
42785. Three-piece six-strip hexagonal split bamboo black-bass-fly rod; weight 10 oz. U. S. Fish Commission. (C. B. & M.)
42786. Three-piece six-strip hexagonal split bamboo trout-fly rod; weight 6½ oz. U. S. Fish Commission. (C. B. & M.)

These two rods are protected by well-seasoned pine forms, which also prevent the pieces from warping and keep them straight.

RODS.

39478. Split bamboo rod. H. L. Leonard, Bangor, Me.
 39479. Split bamboo rod. " "
 39480. Split bamboo rod. " "
 42787. Greenheart fly-rod, with split bamboo tips and bamboo tip-case. U. S. Fish Commission. (C. B. & M.)
 42788. Red cedar fly-rod; duplicate joint and 3 tips. U. S. Fish Commission. (C. B. & M.)
 42789. German-silver-mounted ash and lancewood fly-rod; extra tip and bamboo tip-case. U. S. Fish Commission. (C. B. & M.)
 42790. Brass-mounted trout-fly rod (6½ oz.); extra tip and bamboo tip-case. U. S. Fish Commission. (C. B. & M.)
 42791. McGinness six-strip hexagonal split bamboo bait-rod, extra tip, 11 feet long. U. S. Fish Commission. (C. B. & M.)
 42792. Forest and stream six-strip hexagonal split bamboo bait-rod, extra tip, 9 feet long. U. S. Fish Commission. (C. B. & M.)
 42793. Three-piece German-silver-mounted McGinness ash and lancewood minnow-rod; two tips and bamboo tip-case. U. S. Fish Commission. (C. B. & M.)
 42794. Three-piece bait and four-piece fly combination black-bass rod. U. S. Fish Commission. (C. B. & M.)
 39243. Ash and lancewood trout-fly rod. U. S. Fish Commission. (A. & I.)
 32244. Ash and lancewood short black-bass-fly rod. U. S. Fish Commission. (A. & I.)
 42795. Three-piece German-silver-mounted mountain trout rod, ash and lancewood; weight 8 ounces. U. S. Fish Commission. (C. B. & M.)
 42796. Three-piece brass-mounted ash and lancewood mountain trout rod; weight 8 ounces. U. S. Fish Commission. (C. B. & M.)
 42797. Kelly Island bamboo black bass rod. U. S. Fish Commission. (C. B. & M.)
 42798. Kelly Island bamboo black bass rod. U. S. Fish Commission. (C. B. & M.)
 42799. Kelly Island bamboo black bass rod, wound butt, nickel-plated mountings. U. S. Fish Commission. (C. B. & M.)
 42800. Six-strip hexagonal split bamboo Newport striped bass rod, ash butt, German-silver mountings, agate tube top and guide; two tips. U. S. Fish Commission. (C. B. & M.)
 42801. Three-piece ash and lancewood, finest German-silver mountings, duplicate joint, two tips, Newport bass rod. U. S. Fish Commission. (C. B. & M.)
 42802. Three-piece ash and lancewood regular Newport bass rod, German-silver mountings. U. S. Fish Commission. (C. B. & M.)
 42803. Two-piece "chum-rod." Bamboo, German-silver mountings, and wound butt. U. S. Fish Commission. (C. B. & M.)
 42804. Six-strip split bamboo weakfish rod; two tips. U. S. Fish Commission. (C. B. & M.)
 42805. Six-piece, six-strip split bamboo California general rod, making three distinct rods. U. S. Fish Commission. (C. B. & M.)
 42806. Six-piece California general rod, making three distinct styles of rods. Ash and lancewood, 37¼-inch joints. U. S. Fish Commission. (C. B. & M.)
 42807. Seven-piece ash and lancewood trunk rod, 27¼-inch pieces. U. S. Fish Commission. (C. B. & M.)
 42808. Eight-piece ash and lancewood trunk rod, with hollow butt and brass mountings. U. S. Fish Commission. (C. B. & M.)

RODS.

42809. Eight-piece ash and lancewood trunk rod, with hollow butt and German-silver mountings. U. S. Fish Commission. (C. B. & M.)
42810. Eight-piece ash and lancewood trunk rod, German-silver, capped fernles. U. S. Fish Commission. (C. B. & M.)

DISGORGERS.

32717. Halibut "gob-stick." Philip Merchant, Gloucester, Mass.

V. NETS.

17. ENTANGLING-NETS.

MESHING-NETS (entangling in meshes).

‡ *Drift-nets.*† *Those drifting across the tide.*

Shad gill-nets used in Southern rivers.

26126. Model of shad gill-net. American Net and Twine Company, Boston and New York.

Used in rivers of the Atlantic coast.

These nets are knit of linen thread (22-50, 3-cord, and 20-60, 2 cord). They range in length from 50 to 200 fathoms, and in depth from 25 to 90 meshes, $4\frac{1}{2}$ to 5 inch mesh. They are used exclusively as drift-nets.

On the Connecticut River about 4,000 pounds of this netting are used annually. The average weight of a net is 30 to 40 pounds, its depth 45 to 50 meshes, $5\frac{1}{2}$ to $5\frac{1}{4}$ inches.

On the Hudson River about 7,500 pounds are annually used, fine-threads (50-75, 2-cord), 100 to 200 fathoms in length, and from 50 to 90 meshes in depth, $4\frac{1}{2}$ to 5 inch, weight from 15 to 30 pounds to the net.

In the Delaware, Potomac, and Chesapeake 20,000 pounds are used, from 30 to 60 meshes in depth, and $5\frac{1}{2}$ (30 to 40, 2-cord) length, 75 to 100 fathoms.

In the rivers of North Carolina nets are made from coarse twine (22-35, 3-cord, and 20-35, 2-cord) 25 to 40 meshes in depth, 5- $5\frac{1}{2}$ guage. Their length is about 100 yards. About 25,000 pounds are used annually.

In the rivers of South Carolina the twine is slightly finer than in North Carolina (25-35, 3-cord), 25 to 60 meshes deep, the size otherwise about the same. 1,500 pounds are used annually.

In Georgia and Florida about 6,000 pounds are used. This netting is knit from linen thread (30-40, 3-cord, and 25-35, 2-cord) 40 to 60 meshes in depth; $4\frac{1}{2}$ to $5\frac{1}{2}$ mesh. About 18 to 24 pounds are used in a net; its length 100 yards. (A. A. French.)

Series of samples of gill-netting. American Net and Twine Company, Boston and New York:

26848.	Depth 15 meshes,	size of mesh	$1\frac{1}{2}$ inch,	No. 20 (3) thread.
26849.	" 35 "	" "	$2\frac{1}{2}$ "	" 40 (2) "
26850.	" 100 "	" "	$2\frac{1}{2}$ "	" 25 (3) "

MESHING NETS (entangling in meshes).

26851.	Depth 35	meshes,	size of mesh	2½	inch,	No. 30 (3)	thread,
26852.	" 50	"	"	2½	"	" 25 (3)	"
26853.	" 22	"	"	2½	"	" 35 (3)	"
26854.	" 50	"	"	2½	"	" 16 (3)	"
26855.	" 100	"	"	2½	"	" 25 (3)	"
26856.	" 100	"	"	3	"	" 25 (3)	"
26857.	" 100	"	"	3½	"	" 25 (3)	"
26858.	" 16	"	"	3½	"	" 25 (2)	"
26859.	" 16	"	"	3½	"	" 30 (2)	"
26860.	" 40	"	"	3½	"	" 18 (3)	"
26861.	" 50	"	"	4	"	" 20 (3)	"
26862.	" 17	"	"	4	"	" 35 (3)	"
26863.	" 35	"	"	4	"	" 40 (3)	"
26864.	" 16	"	"	4½	"	" 35 (3)	"
26865.	" 45	"	"	4½	"	" 40 (3)	"
26866.	" 14	"	"	4½	"	" 35 (3)	"
26867.	" 14	"	"	4½	"	" 50 (3)	"
26868.	" 14	"	"	4½	"	" 35 (2)	"
26869.	" 14	"	"	4½	"	" 35 (2)	"
26870.	" 16	"	"	4½	"	" 35 (3)	"
26871.	" 16	"	"	4½	"	" 50 (3)	"
26872.	" 18	"	"	4½	"	" 50 (3)	"
26873.	" 16	"	"	4½	"	" 35 (3)	"
26874.	" 45	"	"	5	"	" 30 (2)	"
26875.	" 12	"	"	5	"	" 30 (2)	"
26876.	" 60	"	"	5	"	" 35 (2)	"
26877.	" 65	"	"	5	"	" 40 (2)	"
26878.	" 35	"	"	5½	"	" 35 (3)	"
26879.	" 75	"	"	5½	"	" 35 (3)	"
26880.	" 11	"	"	6	"	" 35 (3)	"

† *Drift-nets.*† *Those drifting across the tide.*

39258. One bale of white gill-netting. American Net and Twine Company,
Boston, Mass.
a. One bale blue gill-netting. "
b. One bale red gill-netting. "

†† *Those drifting along the tide.*

Herring gill-nets.

- 26124-28-38. Herring gill-net. Used on the coast of New England and the Provinces in the capture of the herring (*Clupea harengus*). American net and Twine Company, Boston, Mass.

26129. Herring gill-nets.

- These nets are about 40 yards long and 150 meshes in depth. They are stretched together in big gangs, floated by pieces of wood and weighted by stones. They are made of 45 and 6 thread cotton from 14 to 20 yarn, 2½ inch average mesh. American Net and Twine Company, Boston, Mass.
39481. Model of herring gill-net. American Net and Twine Company, Boston, Mass.

MESHING NETS (entangling in meshes).**Other gill-nets.**

19048. Minnow-net. Pyramid Lake, Nevada. S. Powers.
 1667. Gill-net. Anderson River Eskimos. Anderson River, H. B. T. R. MacFarlane.
 7962. Gill-net made of animal fiber. Kawquettle Indians. Vancouver's Island, B. C. Dr. T. T. Minor.
 19043. Gill-net. Cooyuwee Pi-Ute Indians. Pyramid Lake, Nev. Stephen Powers.
 4765. Gill-net made of "Babiche." Anderson River Indians. Mackenzie's River district, H. B. T. R. MacFarlane.
 4793. Gill-net of "Babiche." Ft. Anderson, McKenzie R. R. MacFarlane

POCKET NETS (entangling in pockets).**Trammel-nets.**

25270. Model trammel-net. 10 feet long, 2 feet wide, 2 and 5 inch mesh. William E. Hooper & Sons, Baltimore, Md.
 26118-29. Trammel-net. American Net and Twine Company.
 Used for general fishing in rivers and ponds of Northern Mississippi Valley.
 These nets range from 20 to 75 yards in length, 4 to 6½ feet in depth. The inside netting of finer linen thread (20-25, 3-cord), mesh 2-2½, ½ deeper than the outside. The outside netting-wall from cotton (15-21 thread), mesh 8 to 10 inches. (A. A. French.)

18. ENCIRCLING-NETS.

SEINES.**In general.**

39442. Piece of tarred seine, to show the difference between a tarred seine and a tanned one. George Merchant, Gloucester, Mass.

Herring-seines.

26119. Model of herring-seine. Used on coasts of New England and the Provinces in capture of herring (*Clupea harengus*), and in the Hudson, Potomac, Delaware, and Chesapeake, and in North Carolina. American Net and Twine Company, Boston, Mass.
 26127. Model of herring-seine. American Net and Twine Company, Boston, Mass.

Cod-seines.

26137. Model of cod-seine. Used in Provinces in capture of cod (*Gadus morrhua*). American Net and Twine Company, Boston and New York. 30 to 40 feet deep. Mesh 5 inches, 18 to 21 thread, cotton.

Baird collecting-seines.

26136. Baird net. Designed by Prof. S. F. Baird. Used by naturalists in collecting small fishes in brooks and ponds and in following behind large seines to secure the small species which escape through the meshes, six-thread coarse cotton. American Net and Twine Company, Boston Mass.
 26126. Model of Baird net. American Net and Twine Company, Boston, Mass.

SEINES.

Bait-seines.

- 26123, 26130. Model of minnow-seine. Used by amateurs in capture of minnow-bait. $\frac{1}{2}$ to $\frac{3}{4}$ -inch mesh, six-thread cotton twine. American Net and Twine Company, Boston, Mass.
26121. Model of minnow-seine, with bag. Used by fishermen to secure bait for eel-pots. American Net and Twine Company, Boston, Mass.

Other seines.

2232. Seine. Anderson River Eskimos. Mackenzie's River district. Robert MacFarlane.
2444. Seine made of "babiche." Tschuktchi Tribe. Capt. John Rodgers, U. S. N., North Pacific Exploring Expedition.
2445. Seine made of "babiche." Tschuktchi Tribe. Capt. John Rodgers, U. S. N., North Pacific Exploring Expedition.
2446. Hand-seine made of grass. Tschuktchi Tribe. Capt. John Rodgers, U. S. N., North Pacific Exploring Expedition.
2447. Hand-seine made of grass. Tschuktchi Tribe. Capt. John Rodgers, U. S. N., North Pacific Exploring Expedition.
19234. Salmon-net. McCloud River Indians. Shasta County, Cal. Livingston Stone.
20648. Salmon-net, with wooden floats and stone sinkers. Indians of Northwest coast. Fort Simpson, B. C. J. G. Swan.
2231. Hand-seine. Anderson River Eskimo. Mackenzie's River district, H. B. T. R. Kennicott.
7929. Fishing-net. Made from fibers of pineapple (*Tillandsia* sp.). Mirador, Mex. Dr. Sartorius.
897. Fishing-net made of willow bark. Kootchin Indians. Mackenzie's River district, H. B. T. R. Kennicott.
4688. Net made of "silkweed." Fort Crook Indians. Fort Crook, Cal. Capt. J. W. T. Gardiner.

HOOP-NETS.

Handle, or dip nets.

Bull-nets (worked with ropes and blocks).

Scoop-nets (herring-nets, pound-scoops, car-scoops, &c.).

39482. Dip-net, frame and handles. U. S. Fish Commission.
25608. Bow of scoop-net. Used in dipping fish from smack's well. J. M. K. Southwick, Newport, R. I.
25165. Series of scoop-net hoops. Wilcox, Crittenden & Co., Middletown, Conn.
39483. Dip-net. For scooping mackerel out of the seine and off the deck. Alex. McCurdy, E. Gloucester, Mass.
25229. Folding dip-net frame. U. S. Fish Commission.
32682. Menhaden shovel-net frame. Gloucester. A. Voss.
32681. Mackerel bow-net " " "

Landing-nets.

25492. Nason's patent net-staff and ring. Flexible ring carried inside of staff. C. F. Nason, patent August 31, 1875. Bradford & Anthony, Boston, Mass.
25493. Nason's patent solid net-staff, with flexible ring. C. F. Nason, patent August 3, 1875. Bradford & Anthony, Boston, Mass.

HOOP-NETS.**Landing-nets—Continued.**

25639. Braided silk landing-net. Bradford & Anthony, Boston, Mass.
 658. Dip-net. Used in the capture of the oulachan (*Osmerus pacificus*).
 Northwest coast of America. G. Gibbs.
 21725. Dip-net. Used by McCloud River Indians in fishing in small streams.
 Shasta County, Cal. Livingston Stone.
 39199. Short-handled landing-net for trout. U. S. Fish Commission. (C.
 B. & M.)
 39200. Landing net for trout and other fish. For use from a boat. U. S.
 Fish Commission. (C. B. & M.)
 39201. Landing-net, with folding ring and bamboo-tip case handle. U. S.
 Fish Commission. (C. B. & M.)

Baited hoop-net:**Crab-nets.**

26801. Crab-nets. American Net and Twine Company, Boston and New
 York.
 32710. Open, cunner-net for *Tautogolabrus*. Gloucester, Mass. G. B. Goode.
 32711. Folding cunner-net. " "

TRAILING-NETS.**Trawls:****Beam-trawl.**

32720. Model of beam-trawl. Made by J. G. Adam. U. S. Fish Commission.

Dredges:**Rake-dredge.**

31792. Model of oyster-dredge and hoisting apparatus. Baltimore, C. S.
 Belbin.
 26140. Four brown dredge-nets for oyster-dredges, &c. American Net and
 Twine Company, Boston and New York.

Towing-nets:**Surface tow-nets.**

25228. Towing-net frame. U. S. Fish Commission.

FOLDING OR JERK NETS.**Purse-nets:****Mackerel and menhaden purse-seines.**

39366. Purse-seine, 165 fathoms long, 10 fathoms or 500 meshes deep, 2½
 inch mesh. Made of No. 10 twine. George Merchant, Gloucester,
 Mass. U. S. Fish Commission.
 26120. Model of purse-seine. American Net and Twine Company, Boston,
 Mass.

These purse-seines range in length from 120 to 220 fathoms, and from 500 to 1,000 meshes in depth, reaching the depth of 20 to 30 fathoms of water. The average mesh is 2½ inches. They are made of fine Sea-Island cotton twine, and cost from \$750 to \$1,500 complete. About 300 are now in use on the coast of North America. The pursing weight varies from 100 to 150 pounds.

FOLDING OR JERK NETS.

Purse-nets—Continued.

- 26122-26125. Model of purse-seine. American Net and Twine Company, Boston, Mass.
32781. Model of purse seine. George Merchant, Gloucester, Mass.
25186. Ring or thimble for pursing-seine. Wilcox, Crittenden & Co., Middletown, Conn.
39489. Oil painting, "Throwing the seine for mackerel;" J. G. Ryder, Boston, Mass.
- Series of paintings, illustrating menhaden fishery, painted by J. G. Ryder, Boston, Mass.
39490. "Looking for a school."
39491. "Sighting a school."
39492. "The driver."
39493. "Pursing up."
39494. "Bailing in."

Cast-nets:

Mullet cast-nets.

Bait cast-nets.

25046. Casting-net. Diameter $4\frac{1}{2}$ feet. William E. Hooper & Sons, Baltimore, Md.
26799. Mullet cast-net. Diameter $5\frac{1}{2}$ feet, $1\frac{1}{2}$ -inch mesh.
26800. Shrimp cast-net. Diameter $4\frac{1}{2}$ feet, $\frac{3}{4}$ -inch mesh.

19. PARTS OF NETS AND APPARATUS FOR MANUFACTURE.

Samples of netting hung to lines. William E. Hooper & Sons, Baltimore, Md.:

- | | | | | |
|--------|----------------|------------|----------------|-------------|
| 25048. | 1-inch mesh, | 12 thread, | 1 fathom long, | 2 feet deep |
| 25047. | $1\frac{1}{2}$ | " 12 | " 1 | " 2 |
| 25051. | $1\frac{1}{2}$ | " 12 | " 1 | " 2 |
| 25050. | 2 | " 12 | " 1 | " 2 |

Netting-needles.

25596. Seine-needle (home made). J. M. K. Southwick, Newport, R. I.
25593. Seine-needle.
25712. Seine-needle (called hanging-needle). N. H. Payne, Wellfleet, Mass.
39484. Knitting-gauge. Used in regulating size of mesh. American Net and Twine Company, Boston and New York.

Eskimo netting-needles.

9839. Seine-needle. Eskimos. Northeastern America. S. F. Baird.
16202. Seine-needle. Magemut Eskimos, Nunivak Island, Alaska. W. H. Dall.
5613. Seine-needle of wood. Yukon River. W. H. Dall.
5614. Needle of bone. Norton Sound Eskimos. "
- 16170, 16169, 16166, 16167, 16168, 16171, 16196. Seine-needles of bone. Magemut Eskimos. Nunivak Island. W. H. Dall.
1180. Seine-needle of wood. Chirikoff. W. H. Dall.
1315. Netting-needle. Eskimos. Smithsonian Institution.
9839. Seine-needle of bone. Eskimos of Northeastern America. S. F. Baird.

VI. TRAPS.

20. PEN-TRAPS.

POCKET-TRAPS.

Fish-slides :

Shad-slides, used in the rivers of North Carolina.

25830. Fish-slide. Used in James River, Virginia. Scale 1 inch to the foot. J. G. Adam.
25831. Fish-slide (with box). Used in rivers of Virginia. Scale 1 inch to the foot. J. G. Adam.

LABYRINTH-TRAPS.

Weirs, or pounds.

12102. Bar-weir. Used in Bay of Fundy herring fisheries. Scale, 1 inch to 15 feet. Capt. U. S. Treat, Eastport, Me.
12106. Salmon-weir. Usen in rivers of Maine. Dennis River. Scale, 1 inch to 8½ feet. Prof. S. F. Baird.
23833. Model of heart-weir. American Net and Twine Company.
26841. Model of heart-weir.
25750. Model of pound-net. Used in Lake Michigan. Scale, 3½ feet to 1 inch. Waukegan, Ill. D. D. Parmalee.
24885. Model of weir, or heart-net. Used on southern coast of New England. Scale, 1 inch to 8 feet. Spindel's Cove, Wood's Holl, Mass. Prof. S. F. Baird.
- 26731, 25751. Models of brush-weirs. Used in the Bay of Fundy in capture of herring (*Clupea harengus*). W. B. McLaughlin, Grand Manan, N. B.
25829. Model of fish-weir. Used by aborigines of Virginia in the fifteenth century. From figures in De Bry. J. G. Adam.
25820. Model of fish-trap. Valley of Yukon River. Scale, 1 inch to the foot. W. H. Dall.
39496. Basket-weir, Yukon River, Alaska. L. M. Turner.

Funnel-traps.

Fish-pots.

1754. Wicker fish-pot (model). Used in West Indies. 5 to 15 fathoms. Scale, 1 inch to the foot. H. O. Claughton, St. Martin's, W. I.
39474. Wicker fish-pot. Used by the Indians of California. Prof. D. S. Jordan.

Lobster-pots.

12100. Lobster-pot. Used in Bay of Fundy. 4 to 10 fathoms. Scale, ¼ inch to the foot. Prof. S. F. Baird.
24801. Lobster-pot. Used in Narragansett Bay, in 10 to 15 fathoms. Scale, 3 inches to the foot. J. M. K. Southwick, Newport, R. I.
29296. Model of Noank lobster-pot. G. L. Green, Noank, Conn.
- 26586-7-8-9. Models of lobster-pots. Used on the coast of New England. Johnson & Young, Boston, Mass.
29363. Model of lobster-pot. N. C. Smith, Stonington, Conn.
32719. Lobster-pot bait-hook. Capt. Henry Webb.

LABYRINTH-TRAPS.

Eel-pots, without leaders.

- . Eel-pot. Used in Fisher's Island Sound, Conn. Scale, one-half James H. Latham, Noank, Conn.
- 25015-16. Wicker eel pot, two funnels, with leaders. Used about Martha's Vineyard, in 3 to 10 fathoms. Capt. Josiah Cleveland, maker, Vineyard Haven, Mass.
25014. Wicker eel-pot (three funnels). Used about Martha's Vineyard. Capt. Josiah Cleveland, maker, Vineyard Haven, Mass.
29530. Eel-pot net. Used on the coast of New Jersey. American Net and Twine Company, Boston and New York.

Set-nets.

32733. Set-net. Diameter of largest hoop, 15 inches. U. S. Fish Commission.

Fykes (set-nets with leaders).

25045. Fyke-net. Diameter, 3 feet. Wm. E. Hooper & Sons, Baltimore, Md.
26113. Model of minnow-fyke. American Net and Twine Company, Boston [and New York.
26114. Minnow-fyke. " "
26117. Minnow-fyke. " "

Bass-traps.

25704. Bass-trap. Used in Peconic Bay and Fisher's Island Sound. Scale, $\frac{1}{4}$ inch to the foot. Charles T. Potter.

VII. HUNTING-ANIMALS.

21. HUNTING-MAMMALS.

OTTERS. (See section I.)

VIII. DECOYS AND DISGUISES.

22. BAITS.

NATURAL BAITS.

Flies and other insects. (This should include a collection of those insects which, as the favorite food of fishes, are imitated in making artificial flies.) Arranged with hooks. (See under 29 a.)

(Accessories.) Methods of preparing baits:

Bait-cutters. (See section IV.)

NATURAL BAITS.

Bait-mills. (See section VI.)

Bait-ladles. (See under Scoops.)

Wheelbarrows for bait-clams (Nantucket).

32740. Beach-cart. Nantucket, Mass. W. H. Chase, 2d.

Bait-boxes and cans.

25560. Five bait-boxes. Bradford & Anthony, Boston, Mass.

42828. Osgood folding minnow and fish crate. U. S. Fish Commission. (C. B. & M.)

The crate extended ready for use measures 24 inches long, 8 inches wide, 8 inches deep. The crate when folded is 12 inches long, 8 inches wide, 2 inches deep. Its weight is 1½ pounds. Every angler knows the difficulty of keeping minnows alive, and the frequent failure of all ordinary means for preserving them. It is claimed that the crate meets this want. Floating beside or behind a boat its drag is scarcely perceptible. It occupies so little depth that danger from fastening on logs, &c., is almost entirely obviated. When folded, it occupies so little space that one could easily carry it under his buttoned coat during a walking excursion. Another feature that highly recommends this crate is the ease with which the bait is secured when a fresh minnow is required. No lifting is necessary. By simply tipping up the bow, the lower half, or stern, is submerged, leaving the door clear above the water and convenient to the hand.

ARTIFICIAL BAITS.¹

Trolling-spoons.¹

Spinners.¹

Squids and jigs.¹

"Bobs," used in Southern waters.¹

Artificial flies.¹

Accessories to artificial baits.¹

a. Fly-hooks.¹

b. Raw materials for making artificial flies.¹

23. DECOYS.

LIGHT-DECOYS.

Imitations of fishes.

29366. Lure-fish. D. H. Fitzhugh, Bay City, Mich. Used in fishing through the ice for salmon-trout.

29294. Lure-fishes. William Morris, Lake City, Mich. Used in fishing through the ice for pickerel.

These lure-fishes are used to decoy large fish under holes in the ice so that they may be within reach of the spear.

¹Arranged with hooks.

SIGHT-DECOYS.

Lanterns and other apparatus for fire hunting and fishing.

42843. Fishing-jack, dash and camp lamp combined; with head, pole, and dash attachments. Burns signal, sperm or lard and kerosene mixed. Manufactured and patented by Albert Ferguson, New York. U. S. Fish Commission. (C. B. & M.)

Lanterns and torches for weequashing, or fire-fishing for eels, herring, &c.

29365. Boat-lanterns. Used in bow of boat in weequashing or spearing eels by night. Southern New England, James H. Latham, Noank, Conn.
12107. Birch-bark used for torchlight fishing. Passamaquoddy Indians—Eastport, Me. Dr. E. Palmer.
Oil painting by J. S. Ryder, Boston, Mass. "Fire-fishing for herring in Provincetown Harbor." U. S. Fish Commission.

IX. PURSUIT; ITS METHODS AND APPLIANCES.

24. METHODS OF TRANSPORTATION.

BOATS.

Birch-bark canoes.

Used by Indians in hunting and fishing.

26615. Canoe with two Indians fishing. Northern United States. U. S. National Museum.

Wooden sea canoes.

Used by Indians of northwest coast in hunting and fishing.

1785. Wooden canoe. (Model.) Northwest coast. Dr. George Suckley.

Wooden canoes.

Used by Indians of the northwest coast in whaling and sea fisheries.

21594. Wooden canoe. (Model.) Alaska. Dr. J. B. White.
16269. Wooden canoe. (Model, painted.) Ithliuket Tribe. Sitka, Alaska.
W. H. Dall.
640. Wooden canoe. (Model.) Northwest coast. George Gibbs.

Kyaks or bidarkas.

Used by Eskimos of Arctic America in hunting and fishing.

26617. Kyak. (13 feet 9 inches long, 30 inches wide.) Northwest coast, Sitka, Alaska. William Burling.
16275. Kyak. (Model.) Kodiak.
21605. Kyak. (Model, 3-hole.) Alaska. Dr. J. B. White.
14750. Kyak. (Model, with bird-spear, harpoon, and seal-skin float.) Eskimos, Tusiack, North Greenland. Prof. S. F. Baird.

Umiaks or bidarras.

Used by Eskimos in whaling and sea fisheries.

1098. Umiak. (Model.) Fort Anderson, H. B. T. Robert MacFarlane.

BOATS.

Dug-out canoes

Used by Indians of Pacific coast.

21358. Dug-out canoe. (Model.) Hoopah Indians, Trinity River, Cal. S. Powers.

Used in river fisheries of the Southern States.

25728. Dug-out canoe. (Model; scale, inch to foot.) Saint John's River, Florida. Francis C. Goode.

Portable boats.

29506. Hegeman portable folding boat. Length, 10 feet; width, 3 feet. Hegeman Portable Folding Boat Company, Ballston Spa, N. Y.

Directions for setting up boat :

1. Unfold the frame. 2. Place the knees and seats in position before fastening the bottom-end section at the ends of the boat. 3. Fasten the bottom-end section to the ends of the boat by the thumb-screws. 4. Place on the canvas with the cords and tie in a single loop (or bow knot).

39339. Bond's improved sectional boat. Maj. T. B. Ferguson, U. S. Fish Commission.

39486. Shattuck portable boat.

22218. Model of Colvin portable canvas boat. (Patented Oct. 6, 1874.) R. A. Scott & Co., Albany, N. Y.

"This boat consists of a canvas exterior made thoroughly water-proof by a preparation which preserves the strength of the canvas and prevents decay and oxidation. It is shaped like a canoe, sharp at both ends, and cuts the water handsomely. Along the sides and bottom are leather thongs, by which the boughs and limbs cut for frame can be lashed securely to the canvas, with the assistance of the four leather framing blocks or sockets (two for each end), which connect the stem and stern posts (or prow pieces) with the keelson, and it can be readily put together anywhere in the woods, no tools being required for the purpose, excepting an ax or hatchet. The whole of it can be packed away in a space 24 inches long, 6 inches wide, and 3 inches thick. The size now made (No. 3), although but 12 feet long, will carry six men, or four men with their necessary baggage, and weighs but 12 pounds when rolled up. It has been tested in a heavy sea with a frame of green boughs cut only two hours before, and carried a weight of 700 pounds safely and easily."

25879-26-112. Model of Fenner's portable boat. With canvas bottom.

C. A. Fenner, Mystic River, Connecticut.

One of these models is shown closed up in its case ready for transportation, the other set up for use.

42841. Osgood's portable folding canvas boat. Manufactured by Osgood & Chapin, Battle Creek, Michigan.

The following sizes are manufactured :

Length.	Width.	Depth.	Weight.	Length of oars.	Price.
12 feet.	33 in.	12 in.	45 lbs.	6½ feet.	\$35 00
15 feet.	36 in.	13 in.	70 lbs.	6½ feet.	45 00

Size of chest.—For 12-foot boat: 38-in. long, 17 in. wide, 18 in. deep.
For 15-foot boat: 40-in. long, 20 in. wide, 22 in. deep.

BOATS.

Portable boats—Continued.

The 12-foot boat is designed for two men; will carry 600 pounds, and draw 4 inches of water. The 15-foot boat is designed for four men. Is rigged with two pair of oars, will carry 850 pounds, and draw 4 inches of water.

The jointed stretcher is used in place of the sectional bottom-board, with two side-boards, one each side of stretcher. The boat set up this way only weighs 20 pounds, and makes a very convenient boat for trout-fishing, duck-hunting, or exploring in ponds or streams where the paddle will do as well as the oars. A box of water-proofing fluid, with directions, sent with each box.

The canvas is woven to order for this special use, and is stronger than the usual thickness of birch bark or cedar canoes. The water-proofing leaves the canvas soft, preserves the fiber, prevents mildew, and renders it impervious to water. The ribs are red elm, the bottom-board and oars basswood, which is filled with patent wood filling, preventing the water from penetrating the wood. The rowlocks and square staples are of malleable iron.

You can propel the boat rapidly; it is very staunch; will not tip over by rocking or climbing into it from bathing; and can be made ready for the water in two minutes, and requires no tools or ingenuity to set it up.

42842. Oars.

Canoes.

32780. "Shadow canoe," with sails, for cruising, fishing, or hunting. Manufactured by James Everson, boat builder, 489 First street, Brooklyn, E. D., N. Y.

Coracles or skin boats.

9785. Skin boat. Hidatza (*Gros Ventres*) Indians. Fort Buford, Dakota, Dr. W. Matthews, U. S. A.

Whale-boat (used in whale fisheries).

24868. Whale-boat. (Model.) C. H. Shute & Son, Edgartown, Mass.

Seine-boat.

25826-7. Model of Cape Ann seine-boat. Higgins & Gifford, Gloucester.

This model shows the fittings manufactured for seine-boats by Wilcox, Crittenden & Co., Middletown, Conn., to wit: cleat, stern-cap, snatch-block for pursing-seine, steering-oarlock with stern socket, socket used on side of stern for steering, davit-iron, tow-iron, tow-link and hook, belaying-pin, oar-holder, davit-guard and step-plate, breast-brace and eye-plate or oar-holder swivels, all of which are shown in their proper places by full-size articles.

39441. Model of Cape Ann seine-boat. (Scale $\frac{1}{4}$ inch to the foot.) Higgins & Gifford, Gloucester, Mass.

This is the same as the preceding with exception of the seine.

Dories, sharpies, and dingies.

25657. Model of Nantucket dory. (Scale, 1 inch to the foot.) W. H. Chase.

Used in gathering clams for codfish-bait.

BOATS.

Dories, sharpies, and dingees—Continued.

12678. New England dory. (Model; scale, 1 inch to the foot.) Starling & Stevens, Ferryville, Me.

13493. New England dory. (Model; scale, 1 inch to the foot.) Starling & Stevens, Ferryville, Me.

Used in coast fisheries and Bank cod fisheries.

24752. Connecticut sharpie. (Scale, 1 inch to the foot.) Capt. H. C. Chester Noank, Conn.

39367. Dory. Twelve and one-half feet long.

Length, 12 feet 6 inches on bottom; 16 feet 6 inches on top.

Width, 29 inches on bottom; 4 feet 6 inches on top.

Depth, 19 $\frac{1}{4}$ inches amidships; 27 $\frac{1}{4}$ inches forward and aft.

Pine wood for planking and bottom. Oak timbers, gunwales, stem and stern. One thwart, three parting or kid boards.

This size is used principally by the fishermen on the south side of Cape Cod. The custom is to buy the dories for the vessels to fish on Nantucket and Chatham Shoals and off Block Island. After using them one season they usually sell them to be used by shore fishermen.

Rigged for hand-lining on the Banks, the equipment is as follows:

1. Painter, 5 $\frac{1}{2}$ fathoms long, 1 $\frac{1}{2}$ -inch manila rope, leathered in the stem, thimble seized in.
 2. Stern becket, 3 feet of 1 $\frac{1}{2}$ -inch rope, knotted on ends, leathered in holes and served for 20 inches in the middle with white spun yarn.
 3. Stern painter, 2 $\frac{1}{2}$ fathoms buoy-line made fast to stern becket.
 4. Anchor, 16 pounds; ring and part of stock served with spun yarn.
 5. Anchor-line, 20 fathoms buoy-line beat to crown of anchor and secured to the ring by a small string.
 6. Cleat, 4 inches long, inside of stem, for anchor-line.
 7. One pair 8-foot ash oars, served in rowlocks with strand of buoy-line.
 8. One and one-half pairs woken nippers.
 9. Two hand-lines on reels, with gear attached, each 25 fathoms long; leads, 3 pounds.
 10. Bait-bucket (common water-bucket with cover).
 11. Bait-board, 6 inches wide, across the dory (same as thwart).
 12. Dinner-box (common half-peck round box).
 13. Spare hooks.
 14. Two squid-lines (mackerel lines) on reels with jigs attached.
 15. Two bird-lines " " " " hooks "
 16. Gaff, on wooden handle, 2 $\frac{1}{2}$ feet long.
 17. Bait-knife, 6-inch pointed blade.
 18. Six thole-pins on strings.
 19. Shark-lance, iron, 3 feet long, pole 5 feet, \$1.40.
 20. Half-gallon water-jug.
 21. Dory plug, with line attached.
 22. Wooden bailing scoop.
 23. Gob-stick, 2 feet long, for unhooking fish.
 24. Fishing cleats, 1 foot long, one on each side of dory, amidships.
39368. Dory. Thirteen feet long.
- Length, 13 feet on bottom, 17 feet on top.
- Width, 30 inches on bottom, 4 feet 7 inches on top.

BOATS.

Dories, sharpies, and dingies—Continued.

Depth, 20 inches amidships, 28 inches forward and aft.

Pine wood for planking and bottom.

Oak timbers, gunwales, stem and stern.

Two thwarts, three parting or "kid" boards.

This size is quite extensively used in Gloucester. They are used to the greatest extent by vessels for winter codfishing (fresh-fishing, so-called). They are also used in quite large numbers from Provincetown, Beverly, Swampscott, Portsmouth, Newburyport, and fishing ports in the State of Maine, both for shore and Bank fishing.

Rigged for shore trawling and handling, the equipment is as follows:

1. Painter, 5½ fathoms 1¼-inch manila rope, leathered in stem (no thimble).
2. Small cleet, 4 inches long, on inside of stem for anchor-line.
3. Tall single score trawl-roller.
4. One pair woolen nippers with lines.
5. Pieces of leather on forward ends of dory ribband-streaks, to prevent trawl catching in ribbands.
6. Hole in forward thwart and step in bottom of dory for mast.
7. Mast 11 feet long; sprit 11 feet long.
8. One pair 8 feet ash oars, covered with leather in rowlocks.
9. Two hand-lines on reels, with gear attached; leads 2½ and 3 pounds.

10. One-half dozen thole-pins; leather beekets for thole-pins on inside of dory just below the holes.
11. Gaff, with wooden handle 3 feet long.
12. Half-gallon water-jug.
13. Dinner-firkin, with spare hooks.
14. Bait-board across the dory aft of middle thwart.
15. Wooden scoop, for bailing.
16. Bait-knife, 5¼-inch pointed blade.
17. Bait-bucket (common water-pail).
18. Dory-plug, with line attached.
19. Small thimbles attached to gunwale aft, for sail-sheets.
20. Tub of trawl: Ground line, 1,755 feet of 14-pound tarred cotton line; 500 No. 15 hooks, 3¼ feet apart on ground-line; gangings 2 feet long, of white cotton line (30-thread); trawl put in half a flour-barrel, with holes in bottom and sides; beekets and lashings spliced in.
21. Buoy-line 42 fathoms long, used for anchor-line when hand-lining, and on trawl for trawling.
22. Buoy-line 20 fathoms long attached to trawl-buoy.
23. Two 10-pound anchors, ring and part of stock served with spun yarn, strap bent into ring; used for trawl when trawling; one used for anchor when hand-lining.
24. Two mackerel-kits, painted and marked, for trawl-buoys, rigged with staff and swivels.
25. Black ball on gourd-stick for buoy.
26. Fishing cleats, 1 foot long, amidships on each side of dory.
27. Wooden button on starboard side and iron pin on port side of forward thwart, to prevent thwart from rising while the dory is under sail.
28. Sail, 11 feet on foot, 9 feet hoist, 5 feet head.

TS.

Dories, sharpies, and dingees—Continued.

29. Under-running stick, 15 inches long.

30. Gob-stick, 2½ feet long.

39369. Dory. Fourteen feet long.

Length, 14 feet on bottom, 18 feet on top.

Width, 32 inches on bottom, 4 feet 10 inches on top.

Depth, 20 inches amidships, 28 inches forward and aft.

Pine wood for planking and bottom.

Oak timbers for gunwales, stem and stern.

Three thwarts, no parting boards.

This size is not used to any great extent, principally by mackerel seiners, and are designed to row fast in order to keep company with the seine-boat when rowing after schools of mackerel.

Rigged for use in mackerel seining, the equipment is as follows:

1. Painter, 5 fathoms of 2-inch manila rope, leathered in stem, thimble seized in.
2. Stern-becket 3 feet long of 2-inch rope, knotted on ends, served for 2 feet in the middle with manila spun yarn.
3. Two pairs 9-foot ash oars.
4. Wooden scoop for bailing.
5. Knife, 5½-inch pointed blade.
6. Eight thole pins, in leather beackets on inside of dory.
7. Four lines, each 2½ feet long, through holes in ribbon on starboard side of dory, used to fasten to the seine.
8. One buoy line forward and one aft, each four feet long, to fasten to the seine.

39370. Dory. Fourteen and one-half feet long.

Length, 14 feet 6 inches on bottom, 18 feet 10 inches on top.

Width, 36 inches on bottom, 5 feet 6 inches on top.

Depth, 22 inches amidships, 31 inches forward and aft.

Pine wood for planking and bottom.

Oak timbers, gunwales, stem and stern.

Three thwarts, three parting or "kid" boards.

Are used to a great extent by Gloucester and Boston haddock catchers. The style called haddock dory is built strong, and more adapted to carry large loads than for speed. They are built wider and deeper than the fifteen feet bank-dory. They are used almost exclusively for winter fishing, catching haddock, and after picking fish from trawls and loading dory, the vessel goes to the dory, consequently speed and rowing give place to carrying and sea-going qualities.

Rigged for haddock fishing, the equipment is as follows:

1. Painter, 5 fathoms of 2-inch manila rope, leathered in stem, thimble seized in.
2. Stern-becket, 3 feet of 2-inch rope, leathered in holes, served for 2 feet in middle with white spun yarn, knots on ends.
3. Rubber boot-heel bumper on stem.
4. Three-score lignum vitæ patent trawl roller.
5. Two pairs woolen nippers, with lines.
6. Dory knife, 5½-inch, pointed blade.
7. Gob-stick, 2 feet long.
8. Gaff on wooden handle, 2½ feet long.
9. Wooden scoop for bailing.
10. Two dozen thole pins on strings.

BOATS.

Dories, sharpies, and dingies—Continued.

11. Four thwart-lashings of buoy line, 3 feet long.
 12. Two pairs of 9-foot ash oars, zinked in rowlocks.
 13. Dory plug, with bucket and line attached.
 15. Stern-painter (3 fathoms) buoy-line, made fast to stern-becket.
 16. Tub of trawl:
 - Ground line, 1,755 feet of 14-pound tarred cotton line; 500 No. 15 hooks, 3½ feet apart on ground line; gangings 2 feet long, of white cotton twine (30 threads); the trawl in a half flour barrel, with holes in bottom and sides, beckets and lashings spliced in.
 17. Three buoy lines, each 25 fathoms long (one for middle buoy).
 18. One anchor, 12-pound, ring and part of stock served with spun yarn; strap bent into ring.
 19. One killick, 10 pounds, served in eye with spun yarn; strap bent into eye.
 20. One quarter-barrel buoy (painted), with black ball, rigged with swivels and staff.
 21. One painted quarter barrel for middle buoy; slung; no staff; swivels; buoy line wound around.
 22. One painted kit for buoy with staff, swivel, and black ball.
 23. Strips of leather on forward end of dory ribband streaks.
39371. Dory. Fifteen feet long.
- Length, 15 feet on bottom, 19 feet on top.
 Width, 35 inches on bottom, 5 feet 3 inches on top.
 Depth, 21 inches amidships, 30 inches forward and aft.
 Pine wood for planking and bottom.
 Oak timbers for gunwales, stem, and stern.
 Three thwarts, three parting or kid boards.
- The Bank dory, so called, is used to a greater extent than any other by Bank fishermen and fresh halibut catchers, and is not as wide or deep as the fourteen and one-half foot haddock dory, is built more for rowing than the fourteen and one-half foot dory, for in this fishing the vessels anchor and the dories have to be rowed with a load in, oftentimes for miles.
- Rigged for fresh halibut fishing, the equipment is as follows:
1. Painter, 5 fathoms, of 2-inch manila rope, leathered in stem, rhimble seized in 15 inches from stem.
 2. Stern becket, 3 feet of 2-inch rope, knotted on ends, leathered in holes, served for 2 feet in middle with white manila spun-yarn.
 3. Two pairs woolen nippers with lines.
 4. Patent "hurdy-gurdy" or trawl windlass.
 5. Patent trawl-roller, large size, single score, line attached.
 6. Leather on forward end of dory, ribband streaks, to prevent trawl from catching.
 7. Mast-hole in forward thwart and step in bottom of dory for mast.
 8. Wooden button on starboard side and iron pin on port side of forward thwart to prevent thwart from rising while the dory is under sail.
 9. Mast, 15 feet long.
 10. Sprit, "
 11. Sail. 14 feet on foot, 6 feet on head, 13 feet hoist.
 12. Brass dory compass.

ATS.

Dories, sharpies, and dingees—Continued.

13. Canvas compass-pocket on port side of dory aft of forward thwart.
 14. Gallon water-jug.
 15. 1½ dozen thole-pins on strings.
 16. Two pairs 9-foot ash oars, served with buoy-line in rowlocks.
 17. Four thwart lashings of buoy-line, each 3 feet long.
 18. Iron dory gaff.
 19. Dory knife, 10-inch, pointed blade.
 20. Two wooden halibut-killers (ash clubs 2½ feet long).
 21. Wooden scoop for bailing.
 22. Large wood and zinc scoop for bailing (such as the fishermen make).
 23. Stern painter, 3 fathoms buoy-line, made fast to stern becket.
 24. Life-line on bottom of dory, fastened to three small staples, becket or loops spliced in.
 25. Dory-plug, with becket and line attached.
 26. Skate of trawl.
 Ground-line made of 15 lines, 25 fathoms each = 2,250 feet 32-pound tarred cotton line; 150 No. 0288 "Kirby" halibut hooks 15 feet apart on ground-line; gangings 5 feet long, of 14-pound tarred cotton line. The trawl is becketed with lobster twine for bending the gangings, long-eye splices in ends of trawl, canvas skate for trawl.
 27. Two 16-pound trawl anchors, ring and part of stock served with spun yarn, strap bent into the ring.
 28. One hard-wood iron-bound trawl buoy painted, with staff and swivel, gourd-stick and black ball.
 29. One soft-wood half barrel, painted, with staff, swivel, and flag.
 30. Two buoy-lines, each 50 fathoms long.
 31. Two small thimbles attached to gunwale aft for sail sheets.
 32. Rubber boot-heel bumper on stem.
 33. Scrub-broom for halibut, with hoisting straps.
39372. Dory. Fifteen and one-half feet long.

Length, 15 feet 6 inches on bottom; 19 feet 8 inches on top.

Width, 35 inches on bottom; 5 feet 5 inches on top.

Depth, 22 inches amidships; 31 inches forward and aft.

Pine wood for planking and bottom. Oak timbers, gunwales, stem and stern. Three thwarts, three parting or "kid" boards.

• This size is not used to any great extent by American fishermen, but large numbers are shipped annually to the French at St. Pierre, Miquelon. This dory is built about the same depth and width as the haddock dory, and very strong, with six, and sometimes seven, pairs of timbers, with a wide band or ribband on the outside to protect the top of the dory. The gunwales, timbers, stern, and about all other material in this style of dory are larger than are usually put in American dories. The French boats used by their vessels formerly are being fast superseded by the American dory.

The equipment of a dory, rigged for Bank cod trawling, is as follows:

1. Painter 5 fathoms of 2-inch manila rope, served with white marline in stem, thimble seized in.

BOATS.

Dories, sharpies, and dingies—Continued.

2. Stern becket, 3 feet of 2-inch rope, knots on ends, served in holes with rope yarn, served for 2-feet in middle with spun yarn.
3. Stern painter, 3 fathoms of buoy-line.
4. Two pairs of 9-foot ash oars. (One pair second-hand, served with buoy-line in rowlocks, and one pair without service).
5. Wooden scoop for bailing.
6. Gob-stick 2 feet long.
7. Gaff in wooden handle 2½ feet long.
8. Single-score trawl roller.
9. Two pairs woolen nippers, with lines.
10. Plug with becket and line.
11. Four thwart lashings, each 3 feet long, of buoy-line.
12. Rubber boot-heel bumper on stem.
13. Leather on forward ends of dory ribband streaks.
14. Dory knife, 5¼-inch pointed blade.
15. Two bird-lines on reels, with hooks attached.
16. Under-running stick 15 inches long.
17. Brass dory compass in wooden box.
18. Gallon water jug.
19. Tub of trawl.

Ground-line of 11½ lines 25 fathoms each, 18-pound tarred cotton line, 300 No. 14 cod-hooks (center draft eyed), 5½ feet apart, on ground line, gangings 3 feet long, of 6-pound tarred cotton line.

20. One hard-wood iron-bound buoy (painted), rigged with staff, swivels, and black ball.
21. One soft-wood quarter-barrel (painted) for buoy, rigged with staff, swivels, and small flag.
22. Two buoy-lines 25 fathoms each.
23. Two 16-pound anchors, sewed in ring and part of stock with spun yarn and strap bent into ring.
24. 1½ dozen thole-pins on strings.
25. Patent trawl grapnel.

It may be said in addition that there are quite a number of other styles of dories, but these are of local use; as, for instance, the round-sided bilge dory used by the fishermen at Rockport, Pigeon Cove, Lanesville, and all around the cape; built principally for sailing qualities, and also for carrying capacity. They are decked over forward, with washboards, so-called, at the side, and are used for winter and summer fishing, from the shores of the above-named places.

Italian fishing-boats.

Used in harbor fisheries of California.

22213. Italian fishing-boat. (Model; felucca rig.) San Francisco. Livingston Stone.
22214. Italian fishing-boat. (Model; felucca rig.) " "
22215. Italian fishing-boat. (Model; felucca rig.) " "
22217. Italian fishing-boat. (Model.) Chinese fishing-boat. San Francisco. Livingston Stone.

Pinkies.

25898. Noman's Land pinkie-boat. (Model; scale, inch to the foot.) Capt. William Cleveland, Vineyard Haven, Mass.
- Used in cod and coast fisheries.

BOATS.

Hunting-skiffs.

Used for hunting and fishing in mountain lakes.

25681. Adirondack boat. (Model; scale, $\frac{1}{4}$ inch to the foot.) Frederick D. Graves, maker, Boston, Mass.

Dimensions; 15 feet long, 3 feet 6 inches wide; weight, 75 to 80 pounds. For the use of sportsmen this boat is claimed to excel, on account of its *extreme lightness* and *durability*, one man being able by means of a yoke to carry the same to any distance without fatigue. This boat is also adapted for family purposes, the *patent rowlock* enabling the most inexperienced rower of either sex to propel the boat with ease and perfect safety, and without any possible chance of losing the oars.

25899. Anable boat. (Model.) D. L. Fitzhugh, jr., Bay City, Mich.
Used in trout and grayling fishing, with well for live fish.
Length, 16 feet; sides 12 inches high inside, 2 feet 10 inches wide on top, 2 feet 4 inches at bottom.
26624. Saint Lawrence boat. Henry Sweetman, Clayton, N. Y.
Used in trolling in the Thousand Island region. Length, 19 feet; width, 43 inches.
25053. Alexandria Bay boat. (Model.) Cornwall & Walton, Alexandria, N. Y.
Used for hunting and fishing in the Adirondacks and the Saint. Lawrence.

Sea boats.

24999. New England surf-boat. (Model; scale, 2 inches to the foot.) Cragin & Sheldon, makers, Boston, Mass.
Used in harbor, lake, and river fisheries.
25001. Whitehall boat (18 feet). (Model; scale, 2 inches to the foot.) Cragin & Sheldon, Boston, Mass.
25000. Ship's yawl. (Model; scale, 2 inches to the foot.) Cragin & Sheldon, Boston, Mass.
Carried by coasters and fishing smacks.
22216. San Francisco yawl. (Model.) Livingston Stone.
Used by Italian fishermen on coast of California.
25028. Nantucket harbor boat. (Model; scale, 1 inch to the foot.) W. H. Chase.
Used in harbor fishing.

Oyster-canoes.

42758. Chesapeake oyster-pungy. (Model.) Major T. B. Ferguson.
25003. Chesapeake oyster-canoe (made from two logs). (Model; scale, 1 inch to the foot.) Major T. B. Ferguson, Maryland Fish Commission.
Used for oyster-raking in Chesapeake Bay.
39151. (Model.) Chesapeake oyster-canoe.
25002. Chesapeake canoe-pungy. (Model; scale, 1 inch to the foot.) Major T. B. Ferguson, Maryland Fish Commission.
Used in oyster-dredging in Chesapeake Bay.
42757. Chesapeake canoe-pungy. (Model.) Major T. B. Ferguson, Maryland Fish Commission.
39336. Photograph. "View of Pratt St. Wharf, Baltimore, showing fleet of oyster boats." R. H. Edmonds, Baltimore, Md.

BOATS.

Ducking-boats.

25658. Egg Harbor boat. (Model; scale, 1 inch to the foot. P. Brasher, New York City.

Used for hunting in marshes and bays.

26623. New Jersey sneak-box. (Model; scale, 1 inch to the foot.) John D. Gifford, Tuckerton, N. J.

These boats are from twelve to fourteen feet in length; the shelving or sideboards on the stern of the boat are used to hold the decoys while the hunter rows to and from the shooting ground. Used by gunners on Barnegat and Little Egg Harbor Bays, New Jersey.

Cat-rigged fishing-boats.

12099. Bay of Fundy cat-boat. (Model; scale, $\frac{1}{2}$ inch to the foot.) Captain Hallet, Eastport, Me.

Used in herring fisheries.

25026. Martha's Vineyard cat-boat. (Model; scale, $\frac{1}{2}$ inch to the foot.) William H. Chase.

Used in coast fisheries.

29537. Providence River cat-boat. (Model.) J. M. K. Southwick, Newport, R. I.

These boats vary in length from 14 to 19 $\frac{1}{2}$ feet, and cost from \$225 to \$425. Used in lobster fisheries and hook and line fisheries. Built by J. U. Stoddard.

26585. Two-masted cat-boat. (Model; scale, about $\frac{1}{2}$ inch to the foot.) Johnson & Young, Boston, Mass.

Used in New England lobster fisheries.

39314. Grand Bank cod-fishing schooner "Mayor Rogers." (Model 43 inches long.) U. S. Fish Commission.

Sails set, as on a passage to the Banks.

Schooner-rigged fishing-vessels.

39197. Gloucester George's Bank fishing schooner. (Model.) (S. Elwell.) U. S. Fish Commission.

26809. Noank lobster-boat. (Model.) Capt. H. C. Chester, Noank, Conn.

25825. Block Island boat. (Model; scale, $\frac{1}{2}$ inch to the foot.) Capt. H. C. Chester.

Used in cod fisheries and shore fisheries.

25730. Massachusetts schooner-smack. (Model; scale, $\frac{1}{2}$ inch to the foot.) William H. Chase, Boston, Mass.

Used in mackerel fisheries and winter oyster trade.

25731. Maine schooner-smack. (Model; scale $\frac{1}{2}$ inch to the foot.) Capt. H. C. Chester.

Used in Bank cod fisheries and Eastern mackerel fisheries.

26536. Oyster-schooner. (Model; scale, 1 inch to the foot.) T. B. Ferguson, Maryland Fish Commission.

Used in oyster-dredging in Chesapeake Bay.

26584. Schooner-smack. (Model; scale, about $\frac{1}{2}$ inch to the foot.) Johnson & Young, Boston, Mass.

Employed in the New England lobster fisheries.

25727. Noank well-smack. (Model; scale, $\frac{1}{2}$ inch to the foot.) H. C. Chester, Noank, Conn.

Supplies fresh fish to local markets and New York iced-fish trade.

BOATS.

Schooner-rigged fishing-vessels—Continued.

22220. Gloucester schooner, style 1835. (Model.) M. M. McFadyn. First form of sharp-bowed schooner, out of which the present Gloucester schooner was developed.
39337. Gloucester mackerel schooner "Mary Odell." Lent by J. O. Procter, Gloucester, Mass.
39489. Model of mackerel schooner "William M. Gaffney" of Gloucester. John Bishop, Gloucester, Mass.

Ships.

24881. Whaling-barque. (Model; scale, $\frac{1}{4}$ inch to the foot.) U. S. Fish Commission.
Used in northern whale fisheries.

Boats of Great Lakes.

26790. Lake Erie pound boat. (Model.) J. W. Milner.

Steamers.

25824. Menhaden steamer with seine-boats. (Model.) Joseph Lawler, Bristol, Me.
39238. Photographs of menhaden steamers "David H. Wilson." Built in 1875, by the Portland Company.
39239. "William Floyd." Built in 1877 by the Portland Company.
39240. "George W. Beale." Built in 1879, by the Portland Company.
39241. "Portland." Built in 1879, by the Portland Company.
25027. Gill-net steamer. (Model; scale 1 inch to 5 feet 5 inches.)
Used in Lake Michigan fisheries.

APPARATUS ACCESSORY TO RIGGING FISHING-VESSELS.

Blocks.

25821. Three single iron-sheaved, plain-hook tackle blocks. Walter Coleman & Sons, Providence, R. I.
25820. Two double iron-sheaved, plain-hook tackle blocks. Walter Coleman & Sons, Providence, R. I.
25804. "Heart" block. Used to secure the standing or fixed rigging to the hull of the vessel. Walter Coleman & Sons, Providence, R. I.
25805. "Bull's-eye" block. Used to secure the standing or fixed rigging to the hull of the vessel. Walter Coleman & Sons, Providence, R. I.
25819. One single brass-sheaved, sister-hook tackle block. Walter Coleman & Sons, Providence, R. I.
25152. Series of boat-blocks. Used on small fishing-boats around Cape Cod and Newport. Wilcox, Crittenden & Co., Middletown, Conn.
29444. Improved swivel-hook. For blocks and general use. Daniel Walker, Providence, R. I.

Clews and hanks.

25139. Ship's clew for courses. Wilcox, Crittenden & Co., Middletown, [Conn.]
25140. Earing-ring. " "
25141. Throat-ring. " "
25135. Series of spectacle or fore-and-aft clews. With patent clew-thimbles. Wilcox, Crittenden & Co., Middletown, Conn.

APPARATUS ACCESSORY TO RIGGING FISHING-VESSELS.

Clews and hanks—Continued.

25136. Improved heart-clew. Wilcox, Crittenden & Co., Middletown, Conn.
 25142. Tack-ring. " "
 25137. Series of topsail clew-bows. " "
 25138. Series of clew-bars. " "
 29475. Clement's patent self-adjusting jib-hank. Wilcox, Crittenden & Co., Middletown, Conn.
 25143. Jib-head, with patent clew-thimble, used where the jib has been stretched too much; the jib is shortened at the head; and the jib-head is attached to the sail. Wilcox, Crittenden & Co., Middletown, Conn.
 25803. Jib-hank. Goes on jib-stay to hold the sail to it. Walter Coleman & Sons, Providence, R. I.
 25777. Wooden jib-hank. Samuel Elwell, jr., Gloucester, Mass.
 25156. Series of single-stay jib-hanks. Wilcox, Crittenden & Co., Middletown, Conn.
 25157. Series of double-stay jib-hanks. " "
 25215. Self-adjusting jib-hank for double stay. Clement's patent. Wilcox, Crittenden & Co., Middletown, Conn.
 25214. Patent self-adjusting jib-hank. Clement's patent. Wilcox, Crittenden & Co., Middletown, Conn.
 29460. Jib-sheet block (peculiar to Gloucester fishing-vessels). Samuel Elwell, jr., Gloucester, Mass.
 25158. Pratt's patent jib-hank or yacht-jib. Wilcox, Crittenden & Co., [Middletown, Conn.]
 25207. Hook-and-eye for bonnet of jib. " "
 29446. Lizard. Used in connection with the luff of a sail and the mast [hoops and hoisting line-
 29447. Ditto. " "

Chocks.

29468. Line-chock for whale-boat. Provincetown style. William W. Smith, Provincetown, Mass.
 25180. Line-chock for whale-boat. Wilcox, Crittenden & Co., Middletown, [Conn.]
 25216. Bow-chocks. " "
 25195. Boat-chocks. " "
 25192. Ditto. " "
 29420. Line rollers. Used on whale-boats in place of line-chock. Wm. W. Smith, Provincetown, Mass.

Boat-hooks.

25926. Whaler's large-ring boat-hook. E. B. & T. Macy, New Bedford, Mass.
 25614. Whale-boat boat-hook (peculiar to New Bedford). Humphrey S. Kirby, New Bedford, Mass.
 25196. Series of wrought-iron boat-hooks. Wilcox, Crittenden & Co., Middletown, Conn.
 25200. Boat-hook for gunboat. " "
 25197. Double Navy boat-hooks with ball points. Wilcox, Crittenden & [Co., Middletown, Conn.]
 25198. Series of Navy boat-hooks with ball points. " "
 25199. Series of sharp-pointed boat-hooks. " "

PARATUS ACCESSORY TO RIGGING FISHING-VESSELS.

Belaying-pins.

25161. Series of belaying-pins. Wilcox, Crittenden & Co., Middletown, [Conn.
 25169. Belaying-pin for Cape Ann seine-boat. "
 25766. Two belaying-pins. Samuel Elwell, jr., Gloucester, Mass. "

Riggers' hooks.

25194. Deck or hammock hook. Wilcox, Crittenden & Co., Middletown, Conn.
 25155. Sister hooks and thimbles. Wilcox, Crittenden & Co., Middletown, Conn.
 25195. Hammock-hook. Wilcox, Crittenden & Co., Middletown, Conn.
 25145. Wide-mouthed single-hooks, or Cape Ann bonnet-hooks. Wilcox, Crittenden & Co., Middletown, Conn.
 29452. Bonnet-hook-and-eye, for removing the jib. Wilcox, Crittenden & Co., Middletown, Conn.
 25155. Series of hooks and thimbles. Wilcox, Crittenden & Co., Middletown, Conn.
 25943. Purrel hooks. S. Elwell, jr.
 25144. Sister-hooks. Wilcox, Crittenden & Co., Middletown, Conn.
 25150. Sailmaker's bench-hook. Wilcox, Crittenden & Co., Middletown, Conn.
 25185. Hook-and-eye plate. Wilcox, Crittenden & Co., Middletown, Conn.

Grommets.

25116. Series of galvanized iron sail-grommets (Wilcox's patent). Wilcox, Crittenden & Co., Middletown, Conn.
 25117. Series of brass sail-grommets (Wilcox's patent). Wilcox, Crittenden & Co., Middletown, Conn.
 25118. Series of brass grommets. Conical point, rolled rim. Wilcox, Crittenden & Co., Middletown, Conn.
 25119. Series of metallic grommets. First used in America. Wilcox, Crittenden & Co., Middletown, Conn.
 25120. Series of brass grommets. First patented in America. Wilcox, Crittenden & Co., Middletown, Conn.
 25121. Rope-yarn grommets (with worked holes showing mode of use). Wilcox, Crittenden & Co., Middletown, Conn.
 25128. Series of light, galvanized grommet-rings. Wilcox, Crittenden & Co., Middletown, Conn.
 25129. Series of heavy galvanized sail-thimbles. Wilcox, Crittenden & Co., Middletown, Conn.
 25130. Series of heavy iron sail-thimbles (Navy pattern). Wilcox, Crittenden & Co., Middletown, Conn.
 25122. Galvanized iron ring grommet, with worked holes showing mode of use. Wilcox, Crittenden & Co., Middletown, Conn.
 25123. Series of buntline leaders and earring grommets. Wilcox, Crittenden & Co., Middletown, Conn.
 25124. Series of eyelet grommets. Used to line worked holes and couplings to Wilcox's patent grommets. Wilcox, Crittenden & Co., Middletown, Conn.
 25125. Setting-die. Used for inserting eyelets. Wilcox, Crittenden & Co., Middletown, Conn.
 25126. Cutting-punch. Used for cutting grommet-holes. Wilcox, Crittenden & Co., Middletown, Conn.

APPARATUS ACCESSORY TO RIGGING FISHING-VESSELS.

Grommets—Continued.

25127. Series of heavy grommet-rings. Used for earrings. Wilcox, Crittenden & Co., Middletown, Conn.
25131. Series of light iron sail-thimbles. Wilcox, Crittenden & Co., Middletown, Conn.
25132. Series of throat-thimbles. Gloucester pattern. Wilcox, Crittenden & Co., Middletown, Conn.
25133. Series of reef-tackle or saddle-thimbles. Wilcox, Crittenden & Co., Middletown, Conn.
25134. Series of brass sail-thimbles. Wilcox, Crittenden & Co., Middletown, Conn.
25152. Series of open or riggers' thimbles. " "
25153. Series of wire-rope thimbles. " "

Anchors.

32675. Iron killick. A. Voss, Gloucester, Mass.
25162. Boat-anchor. Wilcox, Crittenden & Co., Middletown, Conn.
25163. Grappling-iron for dory. " "
25219. Wooden killick or coast anchor. H. C. Chester, Noank, Conn.
29249. Series of sailors' palms (from best to the poorest). Wilcox, Crittenden & Co., Middletown, Conn.
29423. Sailor's palm (left hand). Wilcox, Crittenden & Co., Middletown, Conn.
29424. Sailor's roping palm, A 1 (right hand). " "
32651. Trawl-killick. Patented by E. N. Twiss, April, 1878. E. N. Twiss.
39421. Voss' improved self-stocking anchor. D. C. Voss, E. Gloucester, Mass.

"This invention consists of a shank and flukes, similar to a common anchor; but its superiority consists in the folding of the stock, which is effected by means of a bar passing through the shank, to which the arms or parts of the stock are pivoted by bolts, the pivoted ends of the stock being so formed as to stop and support the arms at right angles to the shank, and while the folding stock enables you to stow or handle your anchor with ease, it does not prevent it from answering all the purposes of a common stock, as the draught of the cable on the shank cannot fail to bring it into position, nor can the cable get foul with the stock, as the pivot enables the stock to fall back, causing the turn of the cable to ship off.

"It is claimed that its advantages as a trawl-anchor cannot be surpassed, as one can stow them anywhere in the dory and they are out of the way, and besides the advantage of stowing them in the hold of the vessel (as six or eight of them can be stowed in the same space as one of the common anchors)."

22224. Snug-stow anchor. Wilcox, Crittenden & Co., Middletown, Conn.

Drags.

39488. Collins' adjustable marine drag. (Model. Scale of $\frac{1}{2}$.) Captain J. W. Collins, Gloucester, Mass. Used by vessels "laying to" in a storm.

Mast-gear.

25802. Six "purrel trucks." Used on a rope around the mast to keep the gaff on the mast. Walter Coleman & Sons, Providence, R. I.

APPARATUS ACCESSORY TO RIGGING FISHING-VESSELS.

Mast-gear—Continued.

25807. Mast-hoop. Used to hold the sail to the mast. Walter Coleman & Sons, Providence, R. I.
25808. Lace trucks. Used on the foot of sail to attach it to the boom. Walter Coleman & Sons, Providence, R. I.
25159. Series of boat-mast hoops. Wilcox, Crittenden & Co., Middletown, Conn.
29480. Mast-head gear for dory. Amasa Taylor, Provincetown, Mass.
29481. Mast and boom attachment for dory. " " " "
29484. Mast and gaff attachment for whale-boat (new style). Used by Provincetown whalers. Wilcox, Crittenden & Co., Middletown, [Conn.
25181. Mast-hinge for whale-boat. " " " "

Leaders and foot-stops.

25604. Series of sail-leaches and boom foot-stops. Used by Newport smackmen. J. M. K. Southwick, Newport, R. I.
25193. Boom foot-stops. Wilcox, Crittenden & Co., Middletown, Conn.
25181. Mast-hinge for whale-boat. " " " "
29450. Fair-leader. Used on the booms of Gloucester vessels. Samuel Ellwell, jr., Gloucester, Mass.
29463. Patent topsail travelers. Used on square-rigged vessels. Wilcox, Crittenden & Co., Middletown, Conn.
29449. Mast-hook clutch. E. A. Sawyer, Portland, Me.

Boat-builders' materials.

25170. Ring-bolts. Wilcox, Crittenden & Co., Middletown, Conn.
25203. Series of ring-bolts. " " " "
25211. Common oval head clinch boat-nail. Wilcox, Crittenden & Co., [Middletown, Conn.
25213. Countersunk clinch boat-nails. " " " "
25220. Series of boat-rivets. " " " "
25175. Eye plate or oar-holder swivels for Cape Ann seine-boat. " " " "
25176. Gunwale supporter for Cape Ann seine-boat. " " " "
25174. Breast-brace for Cape Ann seine-boat. " " " "
25167. Tow-iron for Cape Ann seine-boats. " " " "
25168. Tow-link and hook for Cape Ann seine-boat. " " " "
29482. Boom-rest or crotch-socket. Used on the taffrail of Cape fishing-vessels when they are "laying to" on George's Banks. Theo. Brown, Wellfleet, Mass.
25204. Water-deck iron. Wilcox, Crittenden & Co., Middletown, Conn.

Rudder-fixtures.

29496. "W. N. Clark's rudder hanger." (Patented September 3, 1867.) James B. Clark, Chester, Conn.

"Advantages claimed for this hanger: To ship the rudder one has only to enter the tongue (which has the rudder already attached) in the grooved plate from the top just far enough to get it steady, and then let it down, when it will go to its place without further care. Hence arises the first great advantage which this hanger possesses over the old way, viz, the ease and dispatch with which the rudder can be shipped under all circumstances.

APPARATUS ACCESSORY TO RIGGING FISHING-VESSELS.

Rudder-fixtures—Continued.

Every boatman knows the trouble he has been to, at times, in trying to ship his rudder, while in a seaway, in the dark, or in muddy water, when the eyes in the boat could not be seen; often being obliged to reach down with his hand to get the lower pintle entered.

From the quickness with which the rudder can be shipped, in any position of the boat, and under any circumstances, and its security when shipped, it must recommend itself for all life-boat purposes, where, in case of an emergency, time is of vital importance.

Another advantage is that with this hanger the rudder cannot of itself unship as has often been the case with the common hanger, when the boat has been left for a short time and the tiller worked out, thereby leaving the rudder free, by striking the bottom or anything sufficient to raise it three or four inches, to unhinge and float away. As will readily be seen, this cannot get away until the rudder has risen the whole length of the tongue, which, of itself, would never happen.

Again, with this hanger the rudder can be shipped and unshipped while under full sail, thus making it very convenient for fishermen or any one sailing over a line or seine, as the rudder can be easily raised far enough to pass over and prevent a line getting caught between the rudder and boat, as would otherwise likely ensue, and when over, by simply letting down the rudder, it will go to its place again ready for use.

By this arrangement we are enabled to get the hinges further down on the rudder, thereby bringing the strain on both of them, while in the old way, the lower eye and pintle are so far from the bottom of the boat, in order to facilitate the shipping of the rudder, that this one has to bear nearly all of the strain." (W. N. Clark.)

25190. Rudder-gudgeons. Wilcox, Crittenden & Co., Middletown, Conn.
 25189. Series of rudder braces. " "
 29472. Dory breast-hook and stern braces. " "

Cleats.

25779. Stay-sail snatch-cleat. Used by Gloucester fishing-schooners. Allen L. McDonald, Gloucester, Mass.
 25809. Wooden cleats. Used to fasten ropes to. William Coleman & Sons, Providence, R. I.
 25218. Series of small cleats. Wilcox, Crittenden & Co., Middletown, Conn.
 25217. Small brass cleats. " "
 25177. Cleats for Cape Ann seine-boat. " "
 25191. Boat-cleats. " "
 39239. Bagnall & Loud's patent gaff topsail cleat and downhaul attachment combined. Patented December 25, 1877. This patent gaff topsail cleat and downhaul attachment is readily applied with one bolt to the gaffs of schooners, brigs, and barks. This gaff topsail cleat swings to any position, overcoming the abrasion of the rope and sides of the cleat, and by a downhaul attachment does away with the bull's-eye or block that was formerly fastened by a bolt driven into the end of the gaff.

Rowlocks.

25088. Whale-boat rowlock. Wilcox, Crittenden & Co., Middletown, Conn.
 25086. Brass wash-streak rowlock. " "
 25113. Steering rowlock with stem socket for Cape Ann seine-boat. Wilcox, Crittenden & Co., Middletown, Conn.

APPARATUS ACCESSORY TO RIGGING FISHING VESSELS.

Rowlocks—Continued.

25114. Socket used on side of stern for steering. Used on Cape Ann seine-boat. Wilcox, Crittenden & Co., Middletown, Conn.
25085. Seine-boat rowlock. Wilcox, Crittenden & Co., Middletown, Conn.
- 25070-72. Polished brass rowlocks. " " "
- 25076, 25077. Polished brass rowlock used on gunning-skiff. Wilcox, Crittenden & Co., Middletown, Conn.
- 25104-5. Galvanized socket rowlocks. Wilcox, Crittenden & Co., Middle-
[town, Conn.
- 25082-3-4. Brass socket rowlocks. " " "
- 25091-2-3. Plain brass patent swivel rowlock. " " "
25101. First patent swivel rowlock put in market. " " "
- 25079-80-81. Plain brass rowlock used on gunning-skiff. Wilcox, Crittenden & Co., Middletown, Conn.
- 25106-7-8. Side-plate rowlock used on gunning-skiff. Wilcox, Crittenden & Co., Middletown, Conn.
22228. Galvanized iron rowlock. Wilcox, Crittenden & Co., Middletown, Conn.
25188. Rowlock for dory. Showing new mode of fastening. Wilcox, Crittenden & Co., Middletown, Conn.
25765. Dory thole-pin rowlock. Samuel Elwell, jr., Gloucester, Mass.
25090. Gun-metal dory rowlock with Southwick's patent fastening. Wilcox, Crittenden & Co., Middletown, Conn.
25100. Dory rowlock, showing patent mode of fastening. Wilcox, Crittenden & Co., Middletown, Conn.
26902. } "Lyman's patent bow-facing rowing-gear." William Lyman, Mid-
39453. { dlefield, Conn. U. S. Fish Commission.

This bow-facing, *i. e.* front view, rowing-gear is an invention which allows the rower to face forward instead of backward, pulling in the same manner as with the ordinary oars. This reverse movement is obtained by having the oar in two parts, each part having a ball-and-socket joint which is attached to the wale of the boat by means of a slot and button, and the two parts connected by a rod (with hinged bearings) which crosses the wale of the boat.

The advantages claimed for this rowing-gear over the ordinary oar, are:

1. *The oarsman faces the direction in which he goes.*
2. The arrangement of the levers is such that the oarsman applies his strength to the best mechanical advantage, enabling him to row faster and more easily than with any other oar.
3. During the stroke the bow of the boat is slightly raised by the motion of the rower instead of being lowered by his motion, as in ordinary rowing.
4. The stroke is longer than with ordinary oars.
5. The oars can be closed up out of the way along the side of the boat without detaching them from the gunwale.
6. It is better from the fact that the blade of the oar is in front and can be *seen* at the beginning of the stroke, so that there is no difficulty in avoiding obstacles, and in a rough sea there is little danger of "catching crabs."
7. With these oars the boatman makes no more effort in steering than in directing his course while walking, and this advantage lessens greatly the effort of rowing.
8. While rowing there is no noise from the bearings.

APPARATUS ACCESSORY TO RIGGING FISHING-VESSELS.

Rowlocks—Continued.

9. A pair of these oars weigh about 5 pounds more than the oars, but this additional weight has this advantage, that at the beginning and end of the stroke it helps to lower and raise the blade owing to the peculiar position of the oar.

10. When these oars are detached from the boat, no wood or iron projections are left on the wale of the boat, as in ordinary rowing-gear, and thus a serious inconvenience is obviated.

These oars can be attached to and detached from the boat very quickly, and they can be closed up in a convenient form for carrying.

These several advantages, viz, *the front view*, the increased ease and speed in rowing, the raising of the bow instead of depressing it, the closing up of the oar out of the way while on the boat, the increased facility in avoiding obstacles, the diminished effort of hand and eyes in steering, the rowing without noise, the better balance and swing of the oars, have commended this new gear to all who have tried it.

This gear can be attached to almost any boat, and is especially adapted to hunting, fishing, and all kinds of pleasure boating."

"Almost any one (even if he has never rowed a boat) with an hour's practice can use these front view oars well; it being much easier to learn to use a pair of these oars than a pair of the back view oars." (William Lyman.)

28292. Frederick D. Graves's improved noiseless rowlock. Fred. D. Graves, Boston, Mas.

"The object of this invention is to improve the construction and operation of the class of rowlocks in such manner as, first, to insure the proper inclination of the blade of the oar, and prevent the liability of its catching the water when feathering in recovering, as well as to insure the proper position of the blade of the oar when making the stroke; secondly, to enable the outer end of the oar to be raised when it is being feathered, in order to prevent its contact with the water in rough weather. My improved rowlock, which is composed of an inclosing ring located on a pintle, and an inner ring inclosed by the ring and adapted to be partially rotated therein; the inside of the inclosing ring is provided with a groove, which extends almost around it, its continuity being broken only by a stop. The pintle of the rowlock is inserted in a socket attached to the gunwale of the boat, the pintle and rowlock being adapted to turn freely in the socket. From the foregoing it will readily be seen that an oar pivoted in the inner ring is adapted to be partially rotated, in addition to its oscillating movements, so that when its stroke is completed it can be turned, so as to feather the blade in the recover stroke. The stop and shoulders of the inner ring are arranged in such mutual relation that the shoulder abuts against the stop, in feathering the oar, before the blade becomes horizontal in cross-section, so that the cross-section of the oar is unnecessarily inclined downward from its forward to its rear edge during the feathering stroke, this inclination of the blade preventing its forward edge from engaging with the water and overturning the rower, or, in other words, causing him to 'catch a crab.' This limitation of the oar in its rotation prevents awkward accidents in feathering, and enables an unskilled person to row with a considerable degree of certainty." (F. D. Graves.)

25098-9. Galvanized iron patent swivel rowlock. Wilcox, Crittenden & [Co., Middletown, Conn.

25095. Galvanized iron patent swivel rowlock. " "

APPARATUS ACCESSORY TO RIGGING FISHING-VESSELS.

Rowlocks—Continued.

25097. Galvanized iron patent swivel rowlock. Wilcox, Crittenden & Co.,
[Middletown, Conn.]
25093. Galvanized iron patent swivel rowlock. " "
- 25073-4-5. Polished brass patent swivel rowlock. " "
- 25102-3. Galvanized socket rowlock. " "
25111. Countersunk rowlock. Used on Ohio River flat-boats. Wilcox, Crittenden & Co., Middletown, Conn.
29459. Rowlock. Newport and Providence River style, Wilcox, Crittenden & Co., Middletown, Conn.
25087. North River pattern rowlock. " "
25089. East River pattern rowlock. " "
29319. Socket-joint rowlock. Frederick A. Gower, Providence, R. I.

"The socket-joint rowlock is intended to increase the speed and improve the convenience of racing boats. Its advantages have proved so easily apparent to oarsmen that there is little need of detailing its strong points, but the following are among its leading features:

Wabbling of the oar is wholly avoided. If the oar is a properly good fit, it will have less than $\frac{1}{4}$ inch of fore-and-aft motion in the lock.

Catching crabs is largely avoided by preventing the oar from jamming in the lock at the beginning or end of the stroke. If a crab should be caught, the rowlock is not strained, and the oar can be recovered without stopping the boat.

A good grip of the water is assured to even the inexperienced oarsman by the shape of the back of the rowlock, which corresponds to that of the oar. The oar settles itself into the proper position on beginning the stroke.

Any length of reach may be taken by long-built men in going forward, avoiding an evil often complained of.

A space half as wide admits passage of the boat. Equipped with this rowlock a six or four oared shell passes through an opening the width of the outriggers. Crews rowing on narrow or bridged water will find this advantage worth the price of the rowlocks in a single season.

Uniting the rods at a single point brings the whole strength of the outrigger into play at every part of the stroke, and an outrigger thus made can hardly be demolished while the boat stands.

Any oars may be used if of recent pattern, *i. e.*, without the unsightly 'bulge' on the loom. It is only necessary to make a slight change in the button, as described below.

Better time may be made. Experiments thus far indicate that the socket-joint rowlock is perceptibly speedier than the common pattern, by the stoppage of wabbling, and general smoothness of action.

Raising a rowlock with the common outrigger is a half hour's trouble with rusty nuts (one or two of which usually twist the bolt off in starting, and experimenting to get the right thickness of washers. With the socket-joint rowlock the same thing is done in two minutes by slipping half or three-quarters of an inch of washers on the shaft under the top rod.

Superior strength. The ordinary iron thole-pins are strong in one direction only; a backward or sidewise blow is likely to bend them. The supporting shaft of the socket-joint rowlock is equally strong all around and withstands a greater strain than the best oars made can apply to it. The whole rowlock is made of the best bronze metal, which will not rust

APPARATUS ACCESSORY TO RIGGING-FISHING-VESSELS.

Rowlocks—Continued.

nor suddenly snap on a frosty morning. Under great mechanical pressure the lower part of the lock has been bent out nearly straight without breaking.

Minor conveniences continually appear in the use of this improvement. There is no wiring to do; no reaching out-board to ship oars; no wriggling the button through the rowlock; no getting grease on the oar-handle by passing through the rowlock; no 'losing the button' outside the out-rigger; no jamming the button between the thole-pins. When the out-riggers are taken off the boat the rods turn on the shaft as a hinge and fold up into a compact bundle not easily bent out of shape nor injured. The rowlocks can be detached entirely, if desired, and each set of rods made into a package as easily carried as a walking-stick, while the rowlock may be put into the oarsman's coat-pocket. Oarsmen having occasion to travel with boats by rail will appreciate this convenience.

This rowlock cannot pretend to be a cheap contrivance; it is made of the best material, and requires expensive labor. Its first cost is more than that of the common pattern, but considering its advantages it will be found cheaper in the end." (F. A. Gower.)

25115. Whitehall pattern rowlock. Wilcox, Crittenden & Co., Middletown, [Conn.
 25112. Detroit or Lake Michigan rowlock. " " "
 22227. "Acme" oarlock. Pattern invented 1876. " "
 25172. Oar-holder for Cape Ann seine-boat (old model). Higgins & Gifford, Gloucester, Mass.
 25171. Oar-holder for Cape Ann seine-boat. Wilcox, Crittenden & Co., Middletown, Conn.
 25109. Becket rowlock.
 25110. " " "

Oars.

25022. One pair white-ash oars (9 feet). R. T. Dodge, maker, Boston, Mass.
 25021. One pair white-ash oars (6 feet). " "
 25041. Pair white-ash oars (12 feet). " "
 25011. Pair pine oars (8 feet). " "
 25023. Pair white-ash oars (9 feet). " "
 25012. Pair spoon oars (10 feet). " "
 25024. Pair white-ash oars (12 feet). " "

Paddles.

25020. White-ash paddles. R. T. Dodge, maker, Boston.

Poles and pushing sticks.

15653. Bidarka pole. Nunivak, Alaska. W. H. Dall.
 15653. Bidarka pole. " " "

Candlestick.

Used in hold of vessel while storing fish.

32692. Candlestick or "Sticking Tommy." Gloucester, Mass. G. Brown Goode.
 39228. Lantern-keg. New Bedford. U. S. Fish Commission.
 This lantern-keg contains a lantern (No. 39232), tinder-box (No. 39233), and flint and steel (No. 39234).

APPARATUS ACCESSORY TO RIGGING FISHING-VESSELS.

Fog-horns.

29382. Series of common reed fog-horns, Nos. 1, 2, 3, and 4. Wilcox, Crittenden & Co., Middletown, Conn.
25783. Grand Bank fog-horn. Called by the fishermen "lipper" or "ripper," William H. Weston, Provincetown, Mass.
25281. The Anderson fog-horn. U. S. Fish Commission. (Deposited.)

Deck-scrapers.

25160. Series of ships' deck-scrapers. Wilcox, Crittenden & Co., Middletown, Conn.
39193. Broom. For scrubbing the decks. U. S. Fish Commission.
39194. Broom. For scrubbing the painted work about the deck. U. S. Fish Commission.

Dory scoop.

25222. Dory scoop. S. Elwell, jr., Gloucester, Mass.
25707. " " Central Wharf Co., Wellfleet, Mass.

Flagging irons, &c.

- Used by mackerelmen of Capes Cod and Ann to separate barrel staves for the insertion of stems of flag to stop leakage.
- 29492-94. Flagging iron, hoop-drivers, and adze. M. W. Grant, Wellfleet, Mass.
32677. Flagging-iron. A. Voss. Gloucester, Mass.

Pump-bolt or toggle-pin.

- Used on fishing-vessels of Cape Cod and Cape Ann.
29470. Pump-bolt or toggle-pin. Wilcox, Crittenden & Co., Middletown, Conn.

Deck-scrubs.

29430. Deck-scrub. Used by the Gloucester fishermen. Samuel Elwell, jr., Gloucester, Mass.

Pump box and haft for seine-boat.

29497. Pump box and haft for seine-boat. Andrew Kennedy, Provincetown, [Mass.]
29499. Pump box and haft for seine-boat. " "

Bung-bucket or "water-thief."

25784. Bung-bucket or "water-thief." Wm. H. H. Weston, Provincetown, Mass.

Water-keg.

39229. Boat water-keg. New Bedford. U. S. Fish Commission.

Boat bucket.

39230. Boat bucket and pins. New Bedford. U. S. Fish Commission

Devil's claw.

- Used to stop the chain when the windlass is wanted for other uses.
29442. Devil's claw. W. H. Hesbolt, Provincetown, Mass.

APPARATUS ACCESSORY TO RIGGING FISHING-VESSELS.

Box hook.

Used in closing boxes packed full of fish.

32695. Box hook or "devil's claw." Gloucester, Mass. G. Brown Goode.

Barrel-lifters.

Used for stowing away mackerel-kegs in holds of vessels.

29291. Barrel-lifters. Wilcox, Crittenden & Co., Middletown, Conn.

32679. Chime barrel-hooks. Gloucester, Mass. G. Brown Goode.

32680. Bilge hooks. Gloucester, Mass. G. Brown Goode.

Ice-hooks.

For lifting ice on vessel from wharf.

32674. Ice-hooks. Gloucester, Mass. G. Brown-Goode.

Ice mallets.

39191. Ice mallet (large). U. S. Fish Commission.

Used in the hold for crushing ice used in packing fresh fish.

39192. Ice mallet (small). U. S. Fish Commission.

Used in winter on deck of fishing vessels to break the ice on the rigging.

Lance-hooks.

Fastened on side of whale-boat to hang lance on.

25919. Lance-hooks. E. B. & F. Macy, New Bedford, Mass.

Grappling gear.

Used to recover lost trawls.

25936. Grappling gear. A. McCurdy, Gloucester, Mass.

22223. Grappling-iron. Used as net and boat anchor about the mouth of the George's River, Maine. Wilcox, Crittenden & Co.

Marline spikes.

29418. Splicer or pricker. Used for splicing trawl-lines. Wilcox, Crittenden & Co., Middletown, Conn.

29455. Marline spike. Made from the jawbone of sperm whale. Robert D. Baxter, Provincetown, Mass.

29419. Marline spike. Made from the jawbone of whale. Frank O. Blake, Portland, Me.

25147. Sailmakers' marline spike. Wilcox, Crittenden & Co., Middletown, Conn.

25148. Sailmakers' marline pricker. " " [Conn.

25164. Series of marline spikes. " " "

25146. Series of hickory hand fids. Wilcox, Crittenden & Co., Middletown, Conn.

25672. Copper marline spike. Made at sea by Thomas Freeman. Used for splicing trawl-lines. Sanford Freeman, Norwichport, Mass.

32693. Splicer. Gloucester, Mass. G. Brown Goode.

APPARATUS ACCESSORY TO RIGGING FISHING-VESSELS.

Rest for harpoon, &c.

11391-2. Rest for harpoon and bow and arrow. Aleutian Islands. Vincent Colyer.

Used on deck of kayak.

1119. Spear-holder. Used by Eskimo, Anderson River. R. MacFarlane.

7430. Spear-holder. Fort Anderson. R. MacFarlane.

PRESERVATIVE FLUIDS AND PAINTS.

32801. Nelson's patent canvas preserving solution. Chresten Nelson, Gloucester, Mass.

This solution is used to preserve canvas from injury by exposure to the weather, in any climate. Sails, &c., treated with the solution do not mildew or become stained in the least, but retain the appearance of new canvas after having been treated, and are as strong as when new.

32802. Piece of canvas showing the operation of Nelson's preserving solution. Chresten Nelson, Gloucester, Mass.

This piece of canvas was exposed to the weather on damp ground for six months, after half had been saturated with the preserving solution.

32803. Piece of canvas showing the operation of Nelson's preserving solution. Chresten Nelson, Gloucester, Mass.

This piece of canvas was exposed to the weather, on damp ground, for two seasons, after one-half had been thoroughly saturated with the preservative solution.

39430. Tarr and Wonsen's copper paint for the bottoms of vessels. Tarr & Wonsen, Gloucester, Mass.

25. CAMP OUTFIT.

SHELTER.

42834. Portable shelter-tent, open front, with curtain. Dimensions 6 feet by 7 feet. U. S. Fish Commission. (C. B. & M.)

FURNITURE.

Beds, mattresses, blankets, &c.

39259. Patent elastic felt mattress and life-preserver. H. D. Ostermoor, New York.

"The mattress consists of several sheets or thicknesses of raw cotton which have been acted upon while under pressure by a preparation, the character of which is a secret to the manufacturers. These sheets of cotton are inclosed in ordinary bed ticking of good quality, and the mattress is similar in appearance to the hair mattress of common use.

"In the quality of softness, elasticity, and general comfort, it is excellent and will be regarded by most persons as superior in this respect to the best hair. This mattress, which is six feet six inches long, by two feet nine inches wide, and five inches thick, supported one man of about 150 pounds weight, with an additional grate-bar, weighing 50 pounds, making 200 pounds aggregate, without sinking enough to wet the upper side of the mattress; it supported two such men with ease, only wetting their feet a little. After twenty-four hours' floating, the ticking having become

FURNITURE.

Beds, mattresses, blankets, &c.—Continued.

thoroughly saturated, the inside was examined and found to be totally untouched by moisture, the extreme outer fibres of the outer sheets being barely touched by the dampness. Heavy weights were then used to sink it, and it remained submerged for forty-eight hours; upon being again examined, the ticking was found completely saturated, while a slight moisture had penetrated a short distance between the thicknesses of raw cotton, the interior of each of these thicknesses, however, being entirely free from any signs of dampness. The mattress was then dried, when the original softness and springiness was observed to return to the material."

42861. Camp-bed, portable, with mosquito-bar all contained in the pillow. Manufactured by the U. S. Camp-Lounge Co., Troy, N. Y. U. S. Fish Commission. (C. B. & M.)

This bed has jointed side rails, mosquito-bar canopy and perfect pillow attachment, all of which fold with the lounge in a small case. The case is applied to the head of the lounge and forms the pillow. Size of case, 2 in. x 7 in. x 23 in.

To put it together.—Put the girths in position at the foot; insert the legs at the head in holes through the side rails and attach the case to the top of the legs. It is put up in thirty seconds.

42864. Rubber camp-bag for carrying blankets, &c. Manufactured by Good-year's Rubber Glove Manufacturing Company, Naugatuck, Conn. U. S. Fish Commission. (C. B. & M.)
42865. Waterproof canvas cover for same. Manufactured by Conroy, Bissett & Malleson. U. S. Fish Commission.

Stool.

3978. Stool. R. MacFarlane.

Used by Eskimos to stand on while watching for seal in water.

COMMISSARY SUPPLIES.

Cooking apparatus.

39240. Can opener.
42844. Camp and portable stove with all equipments for cooking. Manufactured by Taunton Iron Works, Taunton, Mass. U. S. F. C.
42862. Camp kit for two, with cooking utensils packed in solid galvanized iron pail. U. S. Fish Commission. (C. B. & M.)
42860. Thorne's portable cooker for frying fish, making coffee, &c. Manufactured by Pierce & Co., Buffalo, N. Y. U. S. Fish Commission. (C. B. & M.)
29295. Portable camp-stove. H. L. Duncklee, Boston, Mass.
25689. Portable camp-stove. " "
- Open, showing utensils, viz :
- | | |
|----------------------------|--------------------|
| 25690. Six tin plates. | 25695. Coffee-pot. |
| 25691. Six tin cups. | 25696. Dipper. |
| 25692. Six-quart kettle. | 25697. Toast-rack. |
| 25693. Eight-quart kettle. | 25698. Frying-pan. |
| 25694. Stew-pan. | 25699. Bread-pan. |
26843. Lehmen's patent folding camp-baker. Scoville & Johnson, Marquette, Mich.

26. PERSONAL EQUIPMENTS.

CLOTHING.

Fishermen's suits.

42701-6. Ordinary suit for summer. U. S. Fish Commission.

This suit consists of:

1. Straw hat.
2. Blue-flannel shirt.
3. Woolen pants.
4. Oil-cloth barrel.
5. Leather boots.
6. Finger cots, worn when "hooking mackerel."

42707-13. Suit worn while dressing fish. U. S. Fish Commission.

This suit consists of:

1. Black felt hat.
2. Flannel shirt.
3. Cotton jumper.
4. Overalls.
5. Oil-cloth petticoat.
6. Leather boots.
7. Woolen mittens.
8. Oil-cloth sleeves. (No. 32696.)

42714-19. Suit for wet weather in summer. U. S. Fish Commission.

This suit consists of:

1. Sou'wester hat.
2. Flannel shirt.
3. Single oil-cloth jumper.
4. Pants.
5. Red leather boots.
6. Nippers.

42720-31. Woolen suit for winter. U. S. Fish Commission.

This suit consists of:

1. Russia cap.
2. Flannel undershirt.
3. Flannel drawers.
4. Blue flannel overshirt.
5. Woolen jumper.
6. Monkey jacket.
7. Woolen pants.
8. Leather boots.
9. Woolen slippers, worn inside boots.
10. Leather mittens.
11. Woolen socks.
12. Suspenders.

42732-37. Winter suit for wet weather. U. S. Fish Commission.

This suit consists of:

1. "Sou'wester" hat.
2. Double oil-cloth jacket.
3. " pants.
4. Rubber boots.
5. Woolen mittens.
6. Nippers.

CLOTHING.

Fishermen's suits—Continued.

42733-42. Suit of black oil-cloth for wet weather.

This suit consists of:

1. "Son'wester" hat.
2. " jacket.
3. " pants.
4. Yellow oil-cloth mittens.
5. Rubber boots.

42743-49. Winter suit for the roughest weather.

This suit consists of:

1. Rubber "sou'wester" hat.
2. " jacket.
3. " pants.
4. " mittens.
5. Woolen muffler.
6. Rubber boots.
7. Lambskin slipper, worn in the boots.

42750-53. Suit for cook of fishing-vessel.

This suit consists of:

1. Checked-cotton jumper.
2. Checked-cotton pants
3. Cotton apron.
4. Leather slippers.

2128. Water-proof dress. (Complete.) Made from the intestines of sea lion (*Eumetopias stelleri*). Indians of northwest coast of America. Wilkes Exploring Expedition.

Angler's suits.

42857. Smoke-tanned buck antelope skin fishing-jacket, dressed on the plains.

U. S. Fish Commission. (C. B. & M.)

42858. Vest of same material. U. S. Fish Commission. (C. B. & M.)

42835-6-7. Fustian, or mole-skin suit. Manufactured by F. L. Sheldon, Rahway, N. J. U. S. Fish Commission. (C. B. & M.)

Water-proof suits.

42838-9-40. Water-proof canvass suit. Manufactured by F. L. Sheldon, Rahway, N. J. U. S. Fish Commission. (C. B. & M.)

29425. The Merriman life-saving suit. Mr. C. S. Merriman, 341 Broadway, New York City.

The Merriman life-saving dress, as used by the United States Life-Saving Service, is composed of vulcanized rubber made in two parts, consisting of a jacket or tunic which embraces the hood and gloves, and ordinary pantaloons. In the jacket or tunic are three separate air chambers; one in the hood, one in the front or breast, and one covering the back. These air chambers are between the inner and outer skin of the jacket. The bottom of the jacket is provided with an elastic rubber flange to bring over the top of the pants. The pants are provided with a metallic band or ring, placed between the lining and the outside of the pants and faced with a layer of pure elastic rubber for the pur-

CLOTHING.

Water-proof suits—Continued.

pose of producing a water-proof joint. The bottom of the pants terminates in boots.

The important features of the dress are, first, that it protects the wearer entirely from contact with the water, and, being inflated with a stratum of air two or more inches in thickness about the vital parts, protects the wearer also from cold, even in water amongst ice. The floating capacity of the dress is about 300 pounds, which enables a person to ride securely upon the surface of the water. The natural position of the wearer is lying upon the back, and by means of the arms and hands used in overhand motion as oars he can propel himself head foremost at the rate of about one mile per hour. It is found under ordinary circumstances that a man tolerably well skilled in the use of the dress can propel himself and carry a line from a beach through the surf over a bar, when it would be very difficult if not impossible to go with an ordinary surf boat to a vessel in distress. It is claimed that a man equipped in one of these dresses can leave a stranded vessel with a line and pass through any surf to a sand beach. A boat can be pulled by a person clad in this dress with no more inconvenience than if in heavy winter clothing, and the dress can be put on in from two to four minutes, so that a man can go where and as he pleases in it in water, no matter how rough or cold, stay as long as he wish, and come out dry, warm, and comfortable.

These dresses have been in use in the United States Life-Saving Service eight years, and the cost of repairs on those same dresses has been but 9 per cent of their original cost after eight years regular service.

39475. Life-preserving jacket. New York. H. D. Ostermoor.

Oil-skin clothing.

42756. Long oil-cloth coat, worn chiefly by captains, or men on watch. Gloucester, Mass.

29543. Cape Ann coats. J. F. Carter, Gloucester, Mass

29544. Cape Ann pants. " "

Boots, moccasins, leggings, shirts, &c.

26015. Fishermen's red cod boots. Jonathan Buck, Harwich, Mass.

26015. Fishermen's red-leather slippers. " "

26014. Fishermen's black boots. " "

25823. Slippers made of sheep-skin, with the wool on the inner surface. Worn by fishermen inside of their boots. A. R. Crittenden, Middletown, Conn.

42845. Black rubber wading trousers, stocking feet. U. S. Fish Commission. (C. B. & M.)

42846. Black rubber wading stockings. U. S. Fish Commission. (C. B. & M.)

42852. One pair oil dressed waterproof shoe packs with hobnails for wading. Manufactured by Thomson & Sons, Bergen, N. J. U. S. Fish Commission. (C. B. & M.)

42847. Silesia wading stockings. U. S. Fish Commission. (C. B. & M.)

42848. Finest quality wading-stockings with improved rubber and cork soles to prevent slipping. U. S. Fish Commission. (C. B. & M.)

42849. Same as above; full length trousers for salmon fishing. U. S. Fish Commission. (C. B. & M.)

CLOTHING.**Boots, moccasins, leggings, shirts, &c.—Continued.**

42863. One pair oil finished moccasins for canoeing. Manufactured by Thomson & Sons, Bergen Heights, N. J. U. S. Fish Commission. (C. B. & M.)
11380. Fine skin shirt. Used by Indians at sea in skin bidarka. The shirt is tied water-tight around the rim of the hoops in the bidarka. Kodiak Island, Alaska. Smithsonian Institution.
5591. Boots made from skin of salmon. Youkon River, Alaska. W. H. Dall.

Hats and caps.

25722. Fisherman's cap, called "Russian cap." E. R. Cook, Provincetown, Mass.
29542. Series of sou'westers and oil-cloth hats (Cape Ann pattern). J. F. Carter, Gloucester, Mass.

Clothing for the hands.

39286. Pair of knit woolen mittens, used by mackerel fishermen. A. Howard Clark, Gloucester, Mass.
25788. Pair of mittens. Called "Newfoundland cuffs" by fishermen. Peculiar to Gloucester. A. R. Crittenden, Middletown, Conn.
25790. Mackerel cots. Used on the fingers when taking mackerel by hook and line. Capt. Samuel Elwell, Gloucester, Mass.
32694. Finger-stall or cot (home-made). J. W. Collins, Gloucester, Mass.
32695. " " " " " "
25787. Pair of "hand-haulers." Used by fishermen off the Newfoundland Banks. Joseph Parsons, jr., East Gloucester, Mass.
25789. Pair of nippers; peculiar to Gloucester, Mass. Joseph Parsons, East Gloucester, Mass.
25718. Pair of nippers. Used by fishermen to protect the fingers while hauling in trawls. David Conwell.
25717. Pair of nippers. Central Wharf Company, Provincetown, Mass.
32655. Rubber cots. Worn on the forefingers to prevent cutting by the mackerel lines. U. S. Fish Commission.

Clothes-bags.

42754. White-clothes bag. Gloucester, Mass.
42755. Black " " "
24231. Bag made from skin of salmon. Alaska. L. M. Turner.

Protection from insects:**Nets for beds and for face.**

26700. Mosquito-net. Property of J. A. Nichols, Syracuse, N. Y. Contributed by Forest and Stream Publishing Company.
42851. Folding mosquito and black fly-net. U. S. Fish Commission. (C. B. & M.)
42866. Head-net for anglers. Manufactured by Roebuck & Co., New York. U. S. Fish Commission. (C. B. & M.)

TRAPPINGS.**Game-bags.**

42853. Crescent-shaped bait-box and strap. U. S. Fish Commission. (C. B. & M.)

TRAPPINGS.

Game-bags—Continued.

42854. Basket-shaped bait-box and strap. U. S. Fish Commission. (C. B. & M.)
42855. Willow creel and leather and web strap. U. S. Fish Commission. (C. B. & M.)
42856. Willow creel, showing new style of left shoulder-strap. U. S. Fish Commission. (C. B. & M.)
42850. Fishing bag, waterproof canvas. Manufactured by F. L. Sheldon, Rahway, N. J. U. S. Fish Commission. (C. B. & M.)
- 4-379. Waterproof canvas tackle-case, or anglers' "carryall," nickel corners for fly-book, reel, spoon baits, &c. Manufactured by Conroy, Bissett & Malleson, New York. U. S. Fish Commission. (C. B. & M.)

NAUTICAL INSTRUMENTS, &c.

Series of navigating instruments. Thaxter & Sons, Boston, Mass.

These instruments and books are such as are used by the best equipped Gloucester fishing vessels. Many vessels are not so well fitted out.

39383. Ship's log. S. Thaxter & Sons, Boston.
39384. Brass compass. "
39385. Ritchie compass. "
39386. Holosteric barometer. "
39387. Lever-clock. Manufactured by the New Haven Clock Company, New Haven, Conn.
39388. Lever-clock. Manufactured by E. Ingraham & Co., Bristol, Conn.
39389. Nautical Almanac for 1880.
39390. Bowditch's "American Practical Navigator" (Bureau of Navigation).
39391. Sextant.
39392. Spy-glass.

MEDICAL OUTFIT.

Medicine-chests.

Medicine-chest, such as is used by the best equipped Gloucester fishing-vessels. U. S. Fish Commission. Contents.

1. Sulphur.
2. Cream of tartar.
3. Epsom salts.
4. Arrow root.
5. Chamomile flower.
6. Flax-seed.
7. " meal.
8. Bicarbonate of soda.
8. Turner's cerate.
10. Mercurial ointment.
11. Basilicon "
12. Simple "
13. Glycerine "
14. Extract of paregoric.
15. " " vitriol.
16. Laudanum.
17. Fryar's balsam.
18. Essence of peppermint.
19. Spirits of nitre.

MEDICAL OUTFIT.

Medicine-chests—Continued.

20. Balsam copaiva.
21. Sulphuric ether.
22. Sirup of squills.
23. Soap liniment.
24. Spirits of lavender.
25. " " camphor.
26. " " hartshorn.
27. Tincture of rhubarb.
28. " " bark.
29. Wine of antimony.
30. Mercurial solution.
31. Muriatic tincture of iron.
32. Seidlitz mixture.
33. Castor oil.
34. Purging pills.
35. Gum arabic.
36. Blue pills.
37. Opium "
38. Fever powders.
39. Calomel and jalap.
40. Dovers powders.
41. Quinine.
42. Ipecac.
43. Calomel.
44. Tincture of myrrh.
45. Rhubarb.
46. Magnesia.
47. Peruvian bark.
48. Tartar emetic.
49. Powdered cubebs.
50. Nitrate of saltpetre.
51. Sugar of lead.
52. White vitriol.
53. Blue "
54. Tartaric acid.
55. Red precipitate.
56. Alum.
57. Gum camphor.
58. Iodide of potash.
59. Lunar caustic.
62. Lancet.
63. Syringe.

The Mariner's Medical Guide.

Some vessels carry smaller chests.

39425. Medicine chest. Prepared for the use of the field parties of the U. S. Fish Commission under the direction of Surgeon J. H. Kidder, U. S. N., U. S. Fish Commission. With pamphlet of instructions.

FISHERMAN'S DWELLINGS, &c.

39426. Series of stereoscopic views of Provincetown, Mass.
 39427. " " " Gloucester, Mass.
 39428. " fifteen large photographs of Gloucester, Mass.

LOG-BOOKS, RECORDS, &c.

Log-books of fishermen.

Log-books kept by masters of New England cod vessels under the requirements of the old bounty law.

CHARTS USED BY FISHERMEN.

In the Exhibits of the United States Coast Survey and the Hydrographic Office may be found the various charts of the coast of the United States prepared by the government. As a rule, however, the fishing vessels prefer to carry the Eldridge charts.

39237. Eldridge's charts. Published by S. Thaxter & Son, Boston, Mass.

- No. 1. The Vineyard Sound and Nantucket Shoals, on a very large scale, with a book of sailing directions. Persons using this chart will save the expense of employing a pilot.
- No. 2. The Coast of North America, from Cape Henry to Cape Sable, including the Chesapeake and Delaware Bays, and George's Shoals, on a large scale.
- No. 3. Cape Cod to Belle Isle, including the Bay of Fundy, Gulf of Saint Lawrence, and Banks of Newfoundland, with plans on a large scale of the coast of Nova Scotia, from Cape Canso to Pictou; the coast of Cape Breton, from Scutari to Sydney, and the harbor of Saint John's, Newfoundland, Saint John, New Brunswick, Halifax, and Miramichi. This is a new chart, prepared from the latest surveys, expressly for the coal and fishing trades.
- No. 4. Boston Harbor, on a large scale, with sailing directions. This chart affords a more practical guide to the various channels, passages, fishing-grounds, &c., of Boston Harbor, than any that has ever been issued. The bearings and distances of dangerous rocks and shoals, and the principal ranges of objects, are all given on the chart.
- No. 5. A new chart of Long Island Sound, from Newport to New York; with a book of sailing directions, containing a full description of the dangers to be avoided in entering the various harbors of the sound.
- No. 6. Lynn to Halibut Point, with the harbors of Salem, Beverly, Marblehead, Manchester, Gloucester, Rockport, and Annisquam; also the stone quarries at Folly Cove, Lanesville, Bay View, &c., on a large scale.
- No. 7. Chesapeake Bay, with the James, York, Rappahannock, and Potomac Rivers. This is a new chart, and the only one published which gives the rivers on a large scale on one sheet.
- No. 8. Montauk Point to Saint Augustine, with a plan of New York Bay and Harbor on a large scale.
- No. 9. Saint Augustine to New Orleans, with Florida Reefs, Bahama Banks, and entrance to Pensacola and Mobile Bays, on a large scale.

CHARTS USED BY FISHERMEN.

No. 10. Buzzard's Bay, on a very large scale, with a book of sailing directions.

Charts 8 and 9 were prepared for the trade between New York, Cuba, and New Orleans, and are arranged so as to avoid the necessity and expense of using four charts, as formerly.

These charts are printed on the best quality of linen paper, and mounted on cloth to make them durable.

LITERATURE OF ANGLING, THE FISHERIES, &c.

1865. NORRIS, THADDEUS.

The | American Angler's Book: | embracing | The Natural History of Sporting Fish, | and | the art of taking them. | With instructions in | fly-fishing, fly-making, and rod-making; and directions for fish-breeding. | To which is added, | Dies Piscatoriæ; | describing noted fishing-places, and the pleasure of | solitary fly-fishing. | New Edition, | with a supplement, | containing descriptions of salmon rivers, inland trout-fishing, etc., etc. | — | By Thaddens Norris. | — | Illustrated with eighty engravings on wood. | Philadelphia: | Published by E. H. Butler & Co. | London: Sampson Low, Son, & Co. | 1865.

1875. SCOTT, GENIO C.

Fishing | In American Waters. | By Genio C. Scott. | (Cut.) | A new edition, containing parts six and seven, | on Southern and Miscellaneous Fishes. | With numerous illustrations. | New York: | Harper & Brothers, publishers, | Franklin Square. | 1875.

1876. BROWN, JOHN J.

The | American Angler's Guide; | or, | Complete Fisher's Manual, | for the United States; | containing | the opinions and practices of experienced | anglers of both hemispheres; | with the various modes adopted in Ocean, River, Lake, and Pond Fishing; | the usual tackle and baits, required; instructions in the art | of making artificial flies; methods of making fish- | ponds, transportation of fish, etc., etc. | Fifth edition, | revised and greatly enlarged and improved with the addition of a | third part, | containing a more particular description of Southern and | Western fishes, and other matter of interest to the | angler, together with a copious index. | Handsomely illustrated | with twenty-five engravings of the principal angle-fish of America, | and embellished with numerous engravings on | steel, stone, and wood. | By | John J. Brown. | New York: | D. Appleton and Company. | 549 and 551 Broadway. | 1876.

1877. HALLOCK, CHARLES.

The | Sportsman's Gazetteer | and | General Guide. | The Game Animals, Birds, and Fishes of North America: | their Habits and various Methods of Capture. | Copious Instructions | in Shooting, Fishing, Taxidermy, Woodcraft, etc. | Together with | a Directory to the Principal Game Resorts of the | Country; illustrated with Maps. | By Charles Hallock, | editor of "Forest and Stream;" Author of the "Fishing Tourist," "Camp | Life in Florida," etc. | New York: | "Forest and Stream" Publishing Company, | American News Company, Agents. | 1877.

LITERATURE OF ANGLING, THE FISHERIES, &c.

1878. JORDAN, DAVID STARR.

Manual | of the | Vertebrates | of the | Northern United States, | including | the District East of the Mississippi River, and North of | North Carolina and Tennessee, exclusive | of Marine Species. | By | David Starr Jordan, Ph. D., M. D. | Professor of Natural History in Butler University. | — | Second edition, revised and enlarged. | — | Chicago: | Jansen, McClurg & Company. | 1878.

1874. SCAMMON, CHARLES M.

The | Marine Mammals | of the | Northwestern Coast of North America, | described and illustrated: | together with an account of | The American Whale-fishery. | By | Charles M. Scammon, | Captain U. S. Revenue Marine. | San Francisco: | John H. Carmany and Company. | New York: | G. P. Putnam's Sons, | 1874.

1860. HOLBROOK, JOHN EDWARDS.

Ichthyology | of | South Carolina. | By John Edwards Holbrook, M. D., | Professor of Anatomy in the Medical College of the State of South Carolina; member | of the Royal Medical Society of Edinburgh; (etc., etc.) | Vol. I. | Charleston, S. C.: | Published by Russell & Jones. | 1860.

1860. BABSON, JOHN J.

History | of the | Town of Gloucester, | Cape Ann, | including the town of Rockport. | — | By John J. Babson. | — | Gloucester: | Published by Procter Brothers. | 1860.

1877. COUES, ELLIOTT.

Department of the Interior. | United States Geological Survey of the Territories. | F. V. Hayden, U. S. Geologist. | — | Miscellaneous Publications, No. 8. | — | Fur-bearing animals: | A monograph | of | North American Mustelidæ, | in which an account of | the wolverine, the martins or sables, the ermine, the mink | and various other kinds of weasels, several species of | skunks, the badger, the land and sea otters, and | numerous exotic allies of these animals, | is contributed to the | History of North American Mammals. | By | Elliott Coues, | captain and assistant surgeon United States Army, | secretary and naturalist of the survey. | — | Illustrated with sixty figures on twenty plates. | — | Washington: | Government Printing Office. | 1877.

1871. McDONALD, J. L.

Hidden Treasures, | or | Fisheries Around the Northwest Coast. | — | "The taking of fish on the banks is a momentous concern." | Fisher Ames. | — | In one volume. | By J. L. McDonald, | of Washington Territory. | — | Procter Brothers, printers, | Advertiser Office, Gloucester, Mass. | 1871.

1878. HALIFAX COMMISSION.

Award of the Fishery Commission. | — | Documents and Proceedings | of the | Halifax Commission, 1877, | under the | Treaty of Washington of May 8, 1871. | In three volumes. | Volumes I, II, III. | (Seal of the Department of State.) | Washington: | Government Printing Office. | 1878.

LITERATURE OF ANGLING, THE FISHERIES, &c.

1822. ADAMS, JOHN QUINCY.

The Duplicate Letters, | the Fisheries and the Mississippi. |
 | Documents relating to Transactions | at the Negotiations
 Ghent. | Collected and published | by John Quincy Adams,
 of the Commissioners of the United States | at that Neg-
 otiation. | — | Washington: | Printed by Davis & Force, (F.
 lin's head.) | Pennsylvania Avenue. | ::::: | 1822.

1867. DERBY, E. H.

Letter | to the Hon. William H. Seward, | Secretary of State
 answer to one from him on the Resolution of | the Senate
 the | Relations of the United States | with | the British
 inces, | and the Actual Condition of | the Question of the
 Fisheries, | from | E. H. Derby. | January, 1857. | Washington,
 | 1867.

PRESIDENT'S MESSAGES.

Message from the President of the United States, transmittin
 information required by a resolution of the House of Repre-
 sentatives of 3d March, 1831, on the subject of the regulatio
 England, France, and the Netherlands respecting their fish

41st Congress, }	House of Representatives.	{ Ex.
2d session. }		{ No.

Fisheries in British Waters. | — | Message | from the | Pres-
 of the United States, | in answer to | a resolution of the F
 of the 7th ultimo relative to fisheries in British | waters.

42d Congress, }	Senate.	{ Ex.
2d session. }		{ No.

Message | from the | President of the United States, | commu-
 ing, | in compliance with a resolution of the 19th January,
 information | in relation to the resources and extent of the
 ing-grounds of the North | Pacific Ocean, opened to the U-
 States by the treaty of Alaska.

1878-79. FOREST AND STREAM AND ROD AND GUN.

13 volumes of "Forest and Stream and Rod and Gun," a w
 paper by Forest and Stream Publishing Company, New
 City.

SECTION D.

METHODS OF PREPARATION.

I. PREPARATION AND PRESERVATION OF FOOD.

1. PRESERVATION DURING LIFE.

FISH-CARS AND OTHER FLOATING CAGES FOR AQUATIC ANIMALS.

29539. Model of fish-marketman's car. For preservation of living fish. J. M. K. Southwick, Newport, R. I.
29221. Model of Providence River fish-car. These are towed by the smack, and as fast as fish are caught they are put in, and so kept for Providence market. D. D. Almy.
29397. Model of Noank lobster-car. Capt. H. C. Chester.
29538. Model of fisherman's car for transporting living fish to market. J. M. K. Southwick, Newport, R. I.

2. PRESERVATION OF FRESHMEATS.

REFRIGERATORS.

Ice-boxes and refrigerators.

39432. Banta refrigerator. Process patented July 1, 1867. Manufactured by G. A. Banta, New York City. Smithsonian Institution.

(Accessory.) The ice-trade:

Ice cutting and handling apparatus.

32799. Low's patent ice crusher. Exhibited by D. W. Low, Gloucester, Mass.
32800. Low's improved ice-pick. Exhibited by D. W. Low, Gloucester, Mass.

3. PRESERVATION BY DRYING.

SUN-DRYING APPARATUS.

Flake-drying:

39433. Codfish-flake. Old style. Model. Capt. N. E. Atwood, Provincetown, Mass.

SUN-DRYING APPARATUS.

Flake-drying—Continued.

39434. Codfish-flake. New style. Model. Capt. Atwood, Provincetown.

The old style or brush-flake has been almost entirely superseded by the new pattern. The new flake is constructed so as to be movable about a horizontal axis, thus making it possible to expose the fish placed upon it to the direct rays of the sun during the whole day, or to keep them in the shade, as may be most desirable.

SMOKE-DRYING APPARATUS.

Herring smoke-houses.

12105. Model of smoke-house used in preparation of herring (*Clupea harengus*). Lubec, Me. U. S. Fish Commission.

12105½. Model of smoke-house used in preparation of salmon (*Salmo salar*). Lubec, Me. U. S. Fish Commission.

4. PRESERVATION BY CANNING AND PICKLING.

SALTING ESTABLISHMENTS.

25750. Model of D. D. Parmalee's Waukegan fishery. J. W. Milner.

This model shows in miniature all the apparatus employed in cleaning and salting down the lake whitefish.

(Accessory.) Salt:

Model of salt-mills used on Cape Cod in former days.

Extensively used in the first half of the present century in obtaining salt by evaporation of sea-water. Their remains are found on Cape Cod and Nantucket.

25706. Model of salt-works. Nantucket, Mass. W. H. Chase, 2d.

CANNING MEATS.

Model of lobster-canning factory.

26583. Model of Johnson & Young's lobster-house, Warren Bridge, near Fitchburg depot. Johnson & Young, Boston, Mass.

This model shows the factory with its vats for steaming the lobsters, the wharf, and the derricks used in handling the lobsters. It is accompanied by models of lobster-smack, and of the principal forms of lobster-nets; catalogued elsewhere.

Oyster-canning factory.

39334. Photograph. Side view of D. D. Mallory & Co.'s oyster-packing house, Baltimore. U. S. Fish Commission.

39335. Photograph. Interior view of a steamed-oyster packing-house, Baltimore. U. S. Fish Commission.

Lithographic view of oyster-packing house, Baltimore, Md.

Cans for fish, &c.

39313. Quart cans (4) for transportation of raw oysters to the interior of the country. R. H. Edmunds, Baltimore.

In these cans raw oysters are placed, and the covers having been soldered on, they are packed in boxes of ice.

39340. Tin cans, for canned fish. Hine & Co., 1315 Doyers street, New York.

39443. Printed ends of boxes showing different brands of boneless fish. Louis Merchant, Gloucester, Mass.

CANNING MEATS.

Specimens of cans for the packing of fish.

39396. "Nonpareil mackerel." Pickert, Butts & Co., Boston, Mass. 5 pounds.
39397. Choice fat mackerel. Franklin Snow & Co., Boston, Mass. 5 pounds.
39398. Extra mackerel. Franklin Snow & Co., Boston, Mass. 5 pounds.
39399. Breakfast mackerel. Franklin Snow & Co., Boston, Mass. 5 pounds.
39400. Selected breakfast mackerel. Franklin Snow & Co., Boston, Mass. 5 pounds.
39401. Fresh lobster. Potter & Wrightington, Boston, Mass. 1 pound.
39402. Family mess mackerel. Boston Packing Company, Boston, Mass. 5 pounds.
39403. Snow-flake cod-fish. H. Mayo & Co., Boston, Mass. 5 pounds.
39404. Paragon boneless herring. H. Mayo & Co., Boston, Mass. 1 pound.
39405. Pure cod-fish. Grocers' Packing Company, Boston, Mass. 1 pound.
39406. Boneless herring, "Tiger Brand." Boston Packing Company, Boston, Mass. 1 pound.
39407. Boneless cod-fish, "Lion & Unicorn." Potter & Wrightington, Boston, Mass. 5 pounds.
39408. Shredded cod-fish. Boston Packing Company, Boston, Mass. 2 pounds.
39409. Minced cod-fish. Potter & Wrightington, Boston, Mass. 1 pound.
39410. Smoked halibut. Potter & Wrightington, Boston, Mass. 1 pound.

5. PREPARATION OF BAITS.

BAIT-MILLS, KNIVES, CHOPPERS, &C. (See, also, under B, 2 and 3.)

26011. Voss' improved bait-mill. (Patented January 17, 1876.) A. Voss, Gloucester, Mass.

6. WHARVES, ETC.

- 39195-6. Model of Gloucester wharf and fish-house. Higgins & Gifford, Gloucester, Mass.
39440. Model of fish-wharf, consisting of fish-weighing scales, weights, fifty little barrels and tubs, culling and packing cribs. Higgins & Gifford, Gloucester, Mass.

II. PREPARATION OF OILS AND GELATINES.

7. EXTRACTION OF WHALE-OIL.

INSTRUMENTS AND APPLIANCES OF RENDERING WHALE-OIL.

Oil painting, by J. S. Ryder, Boston, Mass., "Cutting up a Finback Whale in Provincetown, Harbor." U. S. Fish Commission.

Try-pots.

25013. Model of whaler's try-works. Capt. L. W. Howland, New Bedford, Mass.

This model is accompanied by miniature models of all the implements used in trying out the blubber, viz:

- a. Fire-pike.
- b. Stirring-pole.
- c. Scrap-hopper.
- d. Skimmer.
- e. Bailer.
- f. Cooler.
- g. Deck-pot.
- h. Casks.

8. EXTRACTION OF FISH-OILS.

26889. Model of menhaden oil factory. Owned by Joseph Church & Co. Joseph Lawler, Bristol, Me.

The factory is the most elaborate of the sixty or more on the coast of New England and the Middle States, and is 160 feet in length by 40 in width.

28431. Photographs of A. W. Dodds' Oil Works for trying out oil of halibut, Gloucester. Capt. J. W. Collins.

III. MANUFACTURE OF FERTILIZERS.

9. PREPARATION OF GUANO.

MODEL OF FISH-GUANO WORKS.

Mixers.

26882. Model of guano-mixer. Patented April 27, 1877. Fuchs & Hunt, Baltimore, Md.

This mixer is employed in the fish-guano works for the purpose of thoroughly mixing the fish-scrap with the mineral phosphates and sulphuric acid.

Guano in its various stages, with its ingredients, South Carolina phosphates, Navassa phosphates, scrap (crude and dried), sulphuric acid, kainite, screened and unscreened guano, and seaweed used in preparation: a full series of these is exhibited in the case of Guanos.

SECTION E.

MAL PRODUCTS AND THEIR APPLICATIONS.

I. FOODS.

1. FOODS IN A FRESH CONDITION.

This section includes specimens of such marketable fishes in a fresh condition in refrigerators as can conveniently be forwarded from time to time.

2. FOODS: DRIED AND SMOKED.

SALTED PREPARATIONS.

39435. 1 drum (200 lbs.) large cod (*Gadus morrhua*). Franklin Snow & Co., Boston, Mass.
39436. 1 drum (100 lbs.) small cod. Franklin Snow & Co., Boston, Mass.
39362. 5 boxes "Genuine George's Bank Codfish." H. K. & F. B. Thurber & Co., New York City.
39424. Package George's codfish. A. Howard Clark, Gloucester, Mass.
39425. Various brands of boneless codfish. Prepared by Gloucester firms. A. Howard Clark, Gloucester, Mass.
39349. 2 cases (1 dozen each) "boneless cod," in 5 pound boxes. Potter & Wrightington, Boston, Mass.
39439. Beardsley's shredded codfish (2 cases, 30 lbs. each, in 1 lb. boxes). J. W. Beardsley's Sons, 179 West street, New York.
- . Beardsley's "Beehive Brand boneless codfish" (2 boxes, 35 lbs. each). J. W. Beardsley's Sons.
32707. Minced fish. Made from dry salt codfish. H. Mayo & Co., Boston.
26750. Alden's vapor-cured, snow-flaked, fresh cod-fish, put up in 1876. E. G. Blackford.
32795. Dried meat of abalone (*Haliotis* sp.). Santa Barbara, Cal. D. S. Jordan.
- Dried and exported to China, as food, in large quantities.
39473. Whale sinew, used for food by the Chinese. San Francisco, Cal. D. S. Jordan.

KED PREPARATIONS.

32796. 1 box (25 pounds) smoked halibut (*Hippoglossus vulgaris*). "Greenland halibut." Wm. H. Wonson & Co., Gloucester, Mass.
32797. 1 box (25 pounds) "Grand Bank halibut." Wm. H. Wonson & Co., Gloucester, Mass.
32798. 1 box (25 pounds) "Newfoundland halibut." Wm. H. Wonson & Co., Gloucester, Mass.
39353. 2 cases (2 dozen each) smoked halibut. Potter & Wrightington, Boston, Mass.
- . Smoked halibut. William Snyder, 24 Fulton st., New York.
32696. Paragon herring. Henry Mayo & Co., Boston, Mass.
- Smoked herring (*Clupea harengus*), deprived of skin and bones.

SMOKED PREPARATIONS.

39350. Boneless herring. 2 cases (3 dozen each). Potter & Wrightington, Boston, Mass.
- . Smoked herring, "Beckling Brand." U. S. Fish Commission.
- . Smoked herring. U. S. Fish Commission.
- . Smoked eels (*Anguilla vulgaris*). U. S. Fish Commission.
- . Smoked smelts (*Osmerus mordax*). 6 5-lb. cans. U. S. Fish Commission.
- . Smoked haddock (*Melanogrammus aeglefinus*), "Finnan Haddies." William Snyder, 24 Fulton st., New York.
- . Smoked shad (*Alosa sapidissima*). U. S. Fish Commission.
- . Smoked Spanish mackerel (*Cybius maculatum*). U. S. Fish Commission.
- . Smoked mackerel (*Scomber scombrus*). U. S. Fish Commission.
39352. 2 cases (2 dozen each) smoked salmon. Potter & Wrightington, Boston, Mass.
39440. Smoked bluefish (*Pomatomus saltatrix*). U. S. Fish Commission.
- . Beardsley's "Star Brand Boneless Herring" (2 cases, 2 doz. each). J. W. Beardsley's Sons, New York City.
- . Smoked sturgeon (*Acipenser* sp.). U. S. Fish Commission.

PICKLE OR BRINE SALTED PREPARATIONS.

32717. 1 half barrel extra large No. 1 mackerel (*Scomber scombrus*). 65 fish in the package of 100 pounds. Boston, Mass. U. S. Fish Commission.
39355. 2 cases (1 dozen each), breakfast mess-mackerel in cans. Potter & Wrightington, Boston, Mass.
39361. 1 case "Whole fresh mackerel." H. K. & F. B. Thurber & Co., New York City.
39363. 1 kit "Deep-sea mackerel." H. K. & F. B. Thurber & Co., New York City.
39364. 1 kit "One-pound fancy mackerel." H. K. & F. B. Thurber & Co., New York City.
39365. 1 kit "Selected bloaters (mackerel)." H. K. & F. B. Thurber & Co., New York City.
32702. "Perfection mackerel." Henry Mayo & Co., Boston, Mass.
32703. "Paragon mackerel." " " " "
32704. "Breakfast mackerel." " " " "
32711. Canned mackerel. " " " "
39441. American caviare. Max Ams & Co., 370 Greenwich st., New York.
39437. 2 drums (100 lbs.) hake (*Phycis chuss* and *P. tenuis*). Franklin Snow & Co., Boston, Mass.
39438. 2 drums (100 lbs.) haddock (*Melanogrammus aeglefinus*). Franklin Snow, & Co., Boston, Mass.
39414. Box "Lion and Unicorn Brand" (30 pounds) boneless hake. Potter & Wrightington, Boston, Mass.

PREPARATIONS IN SPICES AND VINEGAR, &C.

39341. 1 case (50 cans) sardines in mustard. Prepared from the herring (*Clupea harengus*). Rosentein Brothers, 332 Greenwich street, New York.
39342. 1 case (50 cans) sardines royales aromatiques. Prepared from the herring (*Clupea harengus*). Rosentein Brothers, 333 Greenwich street, New York.

PREPARATIONS IN SPICES AND VINEGAR, &c.

39442. Sardines in mustard (*Clupea harengus*). Henry Sellman, Eastport, Me.
 39444. Sardines in tomatoes. " "
 39443. Sardines in spices. " "
 39445. Pickled eels (*Anguilla vulgaris*). Max Ams & Co., 370 Greenwich st., New York City.
 39411. Pickled eels, in jelly. S. Schmidt, New York City. (5-pound cans.)
 39412. " " " " (2-pound cans.)
 39446. Pickled oysters (*Ostrea virginica*). (2 jars.) B. J. M. Carley, New York.
 39447. Pickled Little Neck clams (*Venus mercenaria*). (2 jars.) " "
 39448. Pickled clams (*Mya arenaria*). (2 jars.) " "
 26575. Pickled scallops (*Pecten irradians*). Oyster Bay. (2 jars.) B. J. M. Carley, New York City.
 26580. Pickled mussels (*Mytilus edulis*). (2 jars.) East River, N. Y. B. J. M. Carley, New York City.
 —. Pickled oyster crabs (*Pinnotheres ostreum*). (2 jars.) B. J. M. Carley, New York City.
 39423. Ocean trout (*Brevoortia tyrannus*). Hooper & Coit, Port Monmouth, N. J. (1876.)

PREPARATIONS IN OIL.

16609. "American sardines." Prepared "à l'huile" from the menhaden (*Brevoortia tyrannus*). American Sardine Company, New York. (1876.)
 16680 "American boneless sardines." Prepared in olive oil from the menhaden (*Brevoortia tyrannus*). Process patented May 21, 1872. American Sardine Company, New York. (1876.)
 15516. "Shadines." Prepared from the menhaden (*Brevoortia tyrannus*). Port Monmouth Fishery, New York. Hooper and Coit, New York. (1876.)

CANNED PREPARATIONS IN CANS.

32701. Cod-fish balls (*Gadus morrhua*). Henry Mayo & Co., Boston, Mass.
 32709. Fresh cod-fish (*Gadus morrhua*). " "
 24923. Fresh cod-fish. William Underwood & Co., Boston, Mass. (1876.)
 25273. Fresh haddock (*Melanogrammus aeglefinus*). William Underwood & Co. (1876.)
 32701. Fresh cusk (*Brosimius brosme*). Henry Mayo & Co., Boston, Mass.
 52705. Canned fish chowder (cod and haddock). " "
 39157. " " " " " "
 39158. Canned mackerel (*Scomber scombrus*). Wm. Underwood & Co., Boston, Mass.
 39152. " " Franklin Snow & Co., Boston, Mass.
 39357. 1 case canned mackerel (*Scomber scombrus*), 1-pound cans. H. K. & F. B. Thurber, New York City.
 39358. 1 case canned mackerel, 5-pound cans. H. K. & F. B. Thurber & Co.
 26650. "Fresh Seguin Mackerel—Star Brand." Portland Packing Company, Portland, Me. (1876.)
 25855-60. Canned mackerel. Kemp, Day & Co., New York. (1876.)
 34922. Fresh mackerel. William Underwood & Co., Boston. (1876.)
 39354. 2 cases (4 dozen each) fresh mackerel. Potter & Wrightington, Boston, Mass.

COOKED PREPARATIONS IN CANS.

32713. Canned mackerel (*Scomber scombrus*). 4 doz. 1 lb. cans. W. K. Lewis & Bros., Boston, Mass.
25271. Preserved fresh halibut (*Hippoglossus vulgaris*). Wm. Underwood & Co., Boston, Mass. (1876.)
39449. Canned salmon (*Salmo* ———). H. K. & F. B. Thurber & Co., New York.
39450. Fresh Columbia River salmon (canned), (*Salmo quinnat*). "Star Brand." Eureka Packing Co., San Francisco. (4 doz. 1 lb. cans.) H. M. Anthony, 104 Reade st., New York.
- . Mackerel, No. 1. (1 box.) U. S. Fish Commission.
- . Mackerel, No. 2. (1 box.) U. S. Fish Commission.
39360. 1 case canned salmon (*Salmo* sp.), 1-pound cans. H. K. & F. B. Thurber, New York City.
37715. Canned salmon (*Salmo salar*). 4 doz. 1 lb. cans. W. K. Lewis & Bros., Boston, Mass.
24924. Fresh salmon. William Underwood & Co., Boston, Mass. (1876.)
26755. Fresh Columbia River salmon (*Salmo quinnat*), Brookfield, Columbia River, W. T. J. G. Wegler & Co. (1876.)
39345. 1 case canned smelts (*Osmerus mordax*). Henry Mayo & Co., Boston, Mass.
39422. Canned salmon (*Salmo quinnat*). A. Booth & Co., Chicago and San Francisco. (1876.)
- Salmon. (1 box.) U. S. Fish Commission.
- Canned terrapin (*Malacoclemmys palustris*). U. S. Fish Commission.
39356. Canned lobster (*Homarus americanus*). 1 case. H. K. & F. B. Thurber, New York City.
- Canned lobster. (2 doz. 1 pound cans.) Kemp, Day & Co., 116 Wall street, New York City.
39451. Canned lobster. Eastport Packing Co., Eastport, Me.
39160. Canned lobster. Wm. Underwood & Co., Boston, Mass.
32714. Canned lobster. (4 doz. 1 pound cans.) W. K. Lewis & Brothers, Boston, Mass.
39351. 2 cases (4 dozen each) fresh lobster. Potter & Wrightington, Boston, Mass.
39343. Lobster (Royal Brand,) (1 case, 48 cans). Rosentein Brothers, 323 Greenwich street, New York.
- "Egmont Bay lobster." (1 box.) U. S. Fish Commission.
39154. Deviled lobster. U. S. Fish Commission.
39156. Canned shrimps. 2 doz. cans. "
39344. "McMenamin & Co.'s Fresh Hard Crabs." In two pound cans. McMenamin & Co., Hampton, Va.
39452. "McMenamin & Co.'s Fresh Deviled Crabs." McMenamin & Co., Hampton, Va.
39453. Canned fresh hard crabs. Maryland Packing Co., Baltimore, Md. (Packed at Oxford, Md.)
32712. Canned clams. 4 doz. 1 pound cans. W. K. Lewis & Brothers, Boston, Mass.
32706. Canned clam chowder. Henry Mayo & Co., Boston, Mass.
39161. " " Wm. Underwood & Co., Boston, Mass.
- "Soft clam chowder." (2 jars.) B. J. M. Carley, New York City.
39359. 1 case canned oysters (*Ostrea virginica*), 2-pound cans. H. K. & F. B. Thurber & Co., New York.
- Canned oysters. (2 doz. 1 pound cans.) Solid meats. Kemp, Day & Co., 116 Wall street, New York City.

COOKED PREPARATIONS IN CANS.

- "Saddle Rock oysters." (1 box.) U. S. Fish Commission.
26642. The Farmers' Old Orchard Beach clams (Little Necks, star brand). Portland Packing Company, Portland Me. (1876.)
25873. Scarborough Beach clams (*Venus mercenaria*). Put up by Burnham & Morrill, Portland, Me. Kemp, Day & Co., New York. (1876.)
- 25864-6. Orchard Beach clams (*Venus mercenaria*). Kemp, Day & Co., New York. (1876.)
- 25867-9. Little Neck clams (*Venus mercenaria*). Kemp, Day & Co., New York. (1876.)
- 25870-2. Little Neck clams. Put up by Bogart & Co., New York. Kemp, Day & Co., New York. (1876.)
24925. Little Neck clams. Wm. Underwood & Co., Boston, Mass. (1876.)
- Little neck clams. (2 doz. 1 pound cans). Kemp, Day & Co., 116 Wall street, New York City.

Extract of fish.

26749. Extract of fish. Made from the juices of the flesh of fishes (menhaden). S. L. Goodale, Saco, Me.

II. CLOTHING.

3. FURS.

MAMMAL FURS.

Sea otter (*Enhydra marina*), used for muffs, gloves, collars, cuffs, trimmings.

12262. St. Paul's Island, Alaska. H. W. Elliott.

Otter (*Lutra canadensis*), with specimens of the plucked and dyed fur, used for muffs, trimmings, &c.

Fisher or Pekan (*Mustela Pennanti*), used for linings.

2000. Fort Steilacom, W. T. Dr. George Suckley.

Mink (*Putorius vison*), used for cloaks and muffs.

4395. Arctic coast. B. R. Ross.

2803. White River. Puget Sound. Dr. George Suckley.

Fur seal (*Callirhinus ursinus*), used for cloaks, hats, gloves, muffs, linings, trimmings, &c.

26610. Unplucked pelt of fur seal. Alaska. Alaska Commercial Company.

26611. Plucked " " " " " "

26612. Plucked and dressed pelt of fur seal. Alaska. " "

26613. Plucked and dyed pelt of fur seal. Alaska. " "

Musquash (*Fiber zibethicus*) used for muffs, capes, caps and linings, and imitations of beaver fur. Eastern States. U. S. National Museum.

Beaver (*Castor canadensis*), used for linings and muffs.

1230. Spotted albino. Bristol Bay, Alaska.

12506. White albino. U. S. National Museum.

III. MATERIALS EMPLOYED IN THE ARTS AND MANUFACTURES.

* *Hard materials.*

4. IVORY AND BONE.

IVORY OF MAMMALS.

Tusks of walrus used for trinkets, handles, jewelry, buttons, paper-knives, counters, &c.

25656. Tusks of walrus (*Rosmarus obesus*). Alaska. C. H. Crandall.
 11751. Tusks of walrus. Repulse Bay. C. F. Hall.
 16174. Teeth of young walrus (*Rosmarus obesus*). Used in making powder-chargers. Nunivak Island, Alaska. W. H. Dall.
 24819. Ivory of walrus in rough state. Joseph Shardlow, New York.
 24887. Scrimshawed tooth of walrus (*Rosmarus*). (Figure of lady). Geo. Y. Nickerson, New Bedford, Mass.
 2631. Handle of walrus ivory. Northwest coast America. United States Exploring Expedition. Capt. Chas. Wilkes, U. S. N.
 24815-6 Cane handles of walrus ivory. Joseph Shardlow, New York.
 24812. Chain and cross of walrus ivory. " "
 24814. Knobs of walrus ivory. " "
 24813. Scarf-slide of walrus ivory. " "
 24817-18. Sword handles of walrus ivory. " "
 24820-21-22. Knife handles of walrus ivory. " "
 24823. Crochet-needles of walrus ivory. " "

Ivory of narwhal (*Monodon monoceros*), used for canes.

13521. Cane made from tusk of narwhal. Eskimos of North Greenland. F. T. Commagere.

Teeth of sperm-whale (*Physeter macrocephalus*) and their application to the manufacture of balls, buttons, and trinkets.

- 24906-8. Teeth of sperm-whale, polished. J. H. Clark, Newport, R. I.
 15290. " " G. Y. Nickerson, New Bedford, Mass.
 24905. Tooth of sperm-whale. Scrimshawed and mounted as watch case, figure of American eagle. J. H. Clark, Newport, R. I.
 24904. Tooth of sperm-whale. Scrimshawed with figure of crucifix and flowers. J. H. Clark, Newport, R. I.
 24901. Tooth of sperm-whale. Scrimshawed with figure of whaling-ship. J. H. Clark, Newport, R. I.
 24902. Tooth of sperm-whale. Scrimshawed with figure of America in colors. J. H. Clark, Newport, R. I.
 7659. Tooth of sperm-whale. Scrimshawed with this legend: "Taken * by * the * ship * Montreal * of * London * in * the * Pacific * Ocean * from * a * one * hundred * barrel * whale *. — * — * 1835 *." Mrs. Dove, Washington, D. C., 1842.

IVORY OF MAMMALS.

Teeth of the sperm whale—Continued.

24888. Tooth of sperm-whale. Scrimshawed with figure of General Washington and American eagle. Geo. Y. Nickerson, New Bedford, Mass.
24836. Balls turned from teeth of sperm-whale. Joseph Shardlow, New York.

IVORY OF REPTILES.

Teeth of alligator used for jewelry, whistles, cane-handles, buttons, &c.

26895. Jewelry manufactured from teeth of alligator (*Alligator mississippiensis*). E. F. Gilbert, Jacksonville, Fla.
- An extensive trade in alligator teeth has sprung up within the last ten years. Ten establishments in Eastern Florida are engaged in their manufacture into fancy articles.

BONE OF MAMMALS.

Parts of splanchno-skeleton of feræ, used as charms.

9476. "Os mirabilis" of walrus. Alaska. Gen. Geo. H. Thomas, U. S. A.

Sperm-whale jaw-bone, used for harness-rings, martingales, &c.

29374. Sperm-whale jaw-bone in crude state.
- 29232-5. Parasol-handles made from sperm-whale's jaw. Harvey & Ford, Philadelphia.
24909. Chopping-knife. Made from jaw of sperm-whale. Prof. S. F. Baird.
25791. Sail-thimble. Made from bone of whale. J. W. Foster, Beverly, Mass.
25793. Seam-rubber. Used by sail-makers to rub along seams. Made from jaw-bone of sperm-whale. Frank Westerberger, Beverly, Mass.
25650. Sail-maker's hand-fid. Made at sea from jaw-bone of sperm-whale. A. R. Crittenden, Middletown, Conn.
25655. Saw-frame. Made at sea from bone of sperm-whale. J. H. Bartlett & Sons, New Bedford, Mass.
25801. Pulley. Made from jaw-bone of sperm-whale. E. H. Cook, Provincetown, Mass.
25649. Pulley-block. Made at sea from jaw-bone of sperm-whale. A. R. Crittenden, Middletown, Conn.
25713. Seine-needle. Made from jaw-bone of sperm-whale. N. H. Payne, Wellfleet, Mass.

BONE OF FISHES.

Bone of sword-fish.

25675. Sword. Made from sword of sword-fish (*Xiphias gladius*).

5. BALEEN.

WHALEBONE IN AN UNMANUFACTURED STATE.

39235. Slab of whalebone. J. H. Bartlett & Sons, New Bedford, Mass. U. S. Fish Commission.
7494. Whalebone. Anderson River Eskimos. Mackenzie's River district. R. MacFarlane.

WHALEBONE IN AN UNMANUFACTURED STATE.

24950. Dress-bone. Whalebone prepared for dress-makers' use.	J. A. Sevey, Boston, Mass.		
24946. Whalebone. Prepared for suspender-makers' use.	J. A. Sevey, Boston, Mass.		
24945. Whalebone. Prepared for bonnet-makers' use.	J. A. Sevey, Boston, Mass.		
24941. Whalebone. Prepared for umbrella-makers' use.	J. A. Sevey, Boston, Mass.		
24940. Whalebone. Prepared for parasol-makers' use.	J. A. Sevey, Boston, Mass.		
24951. Gross dress-bone. Whalebone prepared for dress-makers' use.	J. A. Sevey, Boston, Mass.		
24948. White dress-bone. Whalebone (white) prepared for dress-makers' use.	J. A. Sevey, Boston, Mass.		
24978. Whalebone. Prepared for brush-makers' use.	J. A. Sevey, Boston, [Mass.]		
24942. Whalebone. Prepared for ribbon-weavers' use.	"	"	
24943. Whalebone. Prepared for hat-makers' use.	"	"	
24944. Whalebone. Prepared for cap-makers' use.	"	"	
24947. Whalebone. Prepared for neck-stock-makers' use.	"	"	
24952. Whalebone. Prepared for corset-makers' use.	"	"	
24949. Round dress-bone. Whalebone prepared for dress-makers' use.	J. A. Sevey, Boston, Mass.		
24938. Whalebone cane. Black and white, twisted.	J. A. Sevey, Boston, [Mass.]		
24973. Whalebone boot-shanks.	"	"	
24967. Whalebone tongue-scrapers.	"	"	
24966. Whalebone probang.	"	"	
24935. Whalebone riding-whip, made of black and white whalebone, twisted.	J. A. Sevey, Boston, Mass.		
24934. Whalebone riding-whip.	J. A. Sevey, Boston, Mass.		
24937. Whalebone cane. Plain.	"	"	
24936. Whalebone cane. Twisted.	"	"	
24972. Whalebone graining-comb. Used by painters.	J. A. Sevey, Boston, [Mass.]		
24980. Whalebone caterpillar-brush.	"	"	
24981. Whalebone shavings.	"	"	
24963. Whalebone back-supporter.	"	"	
24979. Whalebone flue-brush.	"	"	
24975. Whalebone-fiber shoe-brush.	"	"	
24983. Whalebone. Sample.	"	"	
24959. Whalebone divining-rod.	"	"	
24954. Whalebone hip busk-bone.	"	"	
24984. Whalebone. Price-list samples.	"	"	
24961. Whalebone busk.	"	"	
24964. Whalebone fore-arm bones. Artificial.	"	"	
24968. Whalebone plait-raiser.	"	"	
24969. Whalebone penholder.	"	"	
24953. Whalebone corset-clasps.	"	"	
24960. Whalebone drill-bow.	"	"	
24957. Whalebone billiard-cushion springs.	"	"	
24971. Whalebone paper-cutter.	"	"	
24985. Whalebone rule.	"	"	

WHALEBONE IN AN UNMANUFACTURED STATE.

24860. Whalebone and rattan whip-stalk. Finished, ready for covering. American Whip Company, Westfield, Mass.
 24859. Whalebone and rattan. Fitted ready for sticking together for whip-stalk. American Whip Company, Westfield, Mass.
 24982. Whalebone. Prepared for whip-makers' use (patent). J. A. Sevey, Boston, Mass.
 24939. " " " "

6. PLATES.

TORTOISE-SHELL (*Eretmochelys squamata*, Linn.).

- 12387-8-9-90. Tortoise-shell (*Eretmochelys squamata*, Linn.). Pacific hawk's-bill turtle. Pacific coast.
 24890. Commercial tortoise-shell. George Y. Nickerson, New Bedford, Mass.

7. SCALES.

SCALES OF FISHES used in ornamental work, with specimens of flowers and other articles manufactured.

Fish-scale jewelry. F. C. Keergaard & Co., Philadelphia, Pa. :

25480. Scales of sheephead (*Archosargus probatocephalus*).
 25481. Scales of sheephead (*Archosargus probatocephalus*). Prepared for use.
 25482. Brooch and ear-rings. " " "
 25483. Spray of flowers. " " "
 25484. Spray of flowers. " " "
 25485. Spray of flowers. " " "
 25486. Spray of flowers. " " "
 25487. Spray of flowers (dyed). " " "
 25488. Necklace and cross. " " "
 25489. Brooch and ear-rings. " " "
 25490. Brooch and ear-rings (dyed) (*Archosargus probatocephalus*).

8. PEARL.

PEARLS AND NACRE (embracing the pearl-yielding shells, with the pearls and the mother-o'-pearl in the rough state, with the manufactured buttons, handles, and jewelry, pearl-powder, inlaid work, and papier-maché, ornamented with mother-o'-pearl.

32830. Turban-shell (*Trochiscus norrissii*). California. H. Hemphill.
 32832. Top-shell (*Pomaulax undosum*), in natural state. California. H. Hemphill.
 32831. Top-shell, prepared to show pearly layers. California. H. Hemphill.
 29301. Manufactured state of various kinds of American pearl-shells derived from gasteropods or sea-snails. Furnished by A. B. De Frece & Co., 428 Broadway, New York.

PEARLS AND NACRE.

Ear-shells (*Haliotidæ*) used in manufacture of buttons, handles-inlaid work, and pearl powder.

32838. Sea-ears (*Haliotis Kamchatkana*), affording pearl-shell and food. Alaska. J. G. Swan.
32890. Rough sea-ear (*H. corrugata*). Southern California. Used for pearl, shell and for food. Specimen in natural condition. W. H. Dall.
— . Rough sea-ear. Specimen ground and polished to show pearly layers. J. T. Ames.
32900. Red sea-ear or abalone (*H. rufescens*). Monterey, Cal. Used for pearl-shell and for food. Specimens in natural condition. H. Hemphill.
— . Red sea-ear. Polished specimen showing pearly layers. J. T. Ames.
— . Red sea-ear. Fleshy portion prepared and dried for food by California Chinese. Chinese market, California. H. Hemphill.
32823. White abalone (*H. cracherodii*), producing pearl-shell and food. Natural state. California. Paul Schumacher.
32899. White abalone. Natural state. Monterey, Cal. H. Hemphill.
— . White abalone. Polished to show pearly layers. Jas. T. Ames.
4792. White abalone. Polished specimens.
32821. Splendid sea-ear (*H. splendens*), affording food and pearl-shell. California. Paul Schumacher.
32898. Splendid sea-ear. Natural condition. Southern California. H. Hemphill.
— . Splendid sea-ear. Polished to show pearly layers. J. T. Ames.
— . Splendid sea-ear. Young specimen polished. J. T. Ames.
29302. Manufactures of *Haliotis* shell, showing application in the arts. Furnished by A. B. De Frece & Co., 428 Broadway, New York.
29248. Ditto. Parasol-handles. Furnished by Harvey & Ford, Philadelphia, Pa.

Pearl-oysters (*Aviculidæ*), with pearls and nacre.

13507. American pearl-oyster (*M. fimbriata*). Panama. Colonel Jewett.
3624. Ditto. Illustrating formation of pearls. Panama. Colonel Jewett.
32836. Ditto. Gulf of California. J. Xantus.
— . Ditto. Polished shell. Chicopee, Mass. Jas. T. Ames.
32921. Ditto. Made into artificial fish-bait. Boston, Mass. Bradford & Anthony.
32922. Ditto. Made into artificial minnow. Boston, Mass. Bradford & Anthony.
— . Series of buttons, studs, stopper-caps, &c. Manufactured from, and showing application of, American pearl-oyster shell. Furnished by A. B. De Frece & Co., 428 Broadway, New York.

River mussels (*Unionidæ*), with pearls and nacre.

- 26092a. River mussel affording pearl-shell, illustrating application of raw material. Cincinnati, Ohio. D. H. Shaffer.
26092. Carvings, from pearl-shell afforded by river mussels, for use as studs, buttons, pins, brooches, &c. Cincinnati, Ohio. D. H. Shaffer.
- 26092b. Pearls derived from river mussels. Cincinnati, Ohio. D. H. Shaffer.
— . A series of river mussels of various species, one valve polished, the other in its original condition in each case. Chicopee, Mass. Jas. T. Ames.

PEARLS AND NACRE.

Mussels, oysters, and other conchifers supplying pearls and nacre.
 Shells of nautilus and argonaut, prepared to exhibit their nacre.
 Ornamental pearl-work, imitating sprays of flowers, &c.
 Imitation pearls.

9. SHELL.

CAMEO SHELL.

Shell of conch (*Strombus gigas*), and carvings.

— Queen conch (*Strombus gigas*), exported to Liverpool in great numbers and ground up for making porcelain. West Indies.

Shell of helmet (*Cassis rufa*, *C. tuberosa*, and *C. madagascariensis*), with carvings.

6938. Cameo-shell (*Cassis rufa*), used for cameo cutting. Florida. Dr. Wm. Stimpson.

SHELLS USED FOR IMPLEMENTS, &c.

Shells of *Cypræa*, *Rotella*, *Oliva*, *Turritella*, *Phasianella* (Venetian shells), &c., mounted as buttons and jewelry.

Composition shell-work for box-covers and frames, made by gluing shells in mosaic.

29527. Basket. Made from Florida shells. E. F. Gilbert, Jacksonville, Fla.

22210. Basket. Made from Florida shells. Mrs. Mott, Jacksonville, Fla.

22209. Frame. Made from Florida sea-shells. Mrs. C. E. Mott, Jacksonville, Fla.

22211. Easter Cross. Made from Florida shells. Mrs. Mott, Jacksonville.

29526. Shell flowers. Made from Florida shells. E. F. Gilbert, Jacksonville, Fla.

Cuttle-fish bone from *Sepia officinalis*, used as a pounce, as a dentifrice, as polishing powders, for taking fine impressions in counterfeiting, and as food for birds.

32905. Sepia "bone," or endosteum, in natural condition. East coast of the United States. Uses: Fed to cage-birds requiring lime.

32905a. Pounce: Powdered sepia-bone; used in rewriting over erasures to prevent blotting, in medicine as an antacid.

33005. Cuttle-fish (*Octopus punctatus*, Gabb). California to Alaska. Used for bait in the cod-fishery, and by natives as food. Mr. Dall.

Concretions from the stomach of *Astacus*, known as "crab's-eyes" and "crab-stones," and used as antacids.

35525. "Crabs-eyes." U. S. Fish Commission.

Shell of king-crab (*Limulus polyphemus*), used as a boat-bailer.

10. OTHER MATERIALS FROM INVERTEBRATES.

** *Flexible materials.*

11. **LEATHERS.** (Embracing the hides in a rough state, in the various stages of dressing, and manufactured into shoe-leather, parchment, vellum, binders' leather, thongs, &c.)

PREPARED FROM REPTILE SKINS.

Alligator leather.

16810. Salted skin of alligator (*Alligator mississippiensis*). Upper Saint John's River, Florida. G. Brown Goode.
 16810. Tanned skin of alligator. Upper Saint John's River, Florida. G. Brown Goode.
 24796. Cigar-case, made from skin of alligator (*Alligator mississippiensis*). "Russet finish." Schayer Bros., Boston, Mass.
 24702. Lady's satchel, made from skin of alligator (*Alligator mississippiensis*). "Russet finish." Schayer Bros., Boston, Mass.
 24793. Slippers, made from the skin of alligator (*Alligator mississippiensis*). "Russet finish." Schayer Bros., Boston, Mass.
 24794. Slippers, made from skin of alligator (*Alligator mississippiensis*). "Black finish." Schayer Bros., Boston, Mass.
 26068. Riding-boots, made from skin of alligator (*Alligator mississippiensis*). H. & A. Mahrenholz, New York City.
 ———. Gaiters made from skin of the alligator (*Alligator mississippiensis*). H. & A. Mahrenholz, New York City.

PREPARED FROM FISH-SKINS.

Skins of eels (*Anguilla vulgaris*).

25285. Eel-skins. Market, Washington, D. C. G. Brown Goode.
 These eel-skins are highly esteemed by the Virginia negroes as a cure for rheumatism.

Sturgeon leather.

26013. Tanned skin of sturgeon (*Acipenser rubicundus*). Wernich & Wandel, Waukegan, Ill.

Cod-fish leather.

Salmon leather.

12. ISINGLASS.

Isinglass (ichthyocolla), made from air-bladders and skins of fishes and used in the manufacture of fine glues and sizes, adhesive and court plasters, diamond cement, imitation glass, and table-jelly and confectionery (see under D 1, D), in refining wines and liquors, in adulterating milk, in fixing the luster of artificial pearls, and in lustering silk ribbons (embracing the dried bladders and the manufactured products) in their grades of "lyre," "heart-shaped," "leaf," and "book" isinglass.

Isinglass from sounds of cod and hake.

39162. Isinglass. (1st quality.) Haskins Bros., Boston, Mass.
 39163. Isinglass. (2d quality.) " " " "
 39164. Isinglass. (3d quality.) " " " "

REPREPARED FROM FISH-SKINS.

Isinglass from sounds of cod and hake—Continued.

12155. Dried sound of hake (*Phycis chuss*). Used in manufacture of isinglass. Bay of Fundy. Cape Ann Isinglass and Glue Company, Rockport, Mass.
32793. 15 bundles fish isinglass, made from hake (*Phycis chuss*). Howe & French, Boston, Mass.
20744. Dried tongues of fish (probably cod), used by Sitka Indians in making glue. Sitka, Alaska. J. G. Swan.
- . "Diamond" isinglass. W. G. Roby & Co., Boston, Mass.
- . "Banner" isinglass. W. G. Roby & Co., Boston, Mass.
- . "American" isinglass. W. G. Roby & Co., Boston, Mass.
- . Fining compound. W. G. Roby & Co., Boston, Mass.

Isinglass from the squeteague family (*Sciænidæ*), principally used by confectioners.

12127. Dried sound of squeteague (*Cynoscion regalis*), used in the manufacture of isinglass. Long Island Sound. Cape Ann Isinglass and Glue Company, Rockport, Mass.

32726. Exhibit of Gloucester Isinglass and Glue Co.

No. 1.—Sample show case filled with fine isinglass manufactured under John S. Rogers' patent process from salt fish skins, used for the manufacture of court plaster. See sample of same on exhibition, Nos. 14 and 15, by A. I. Woodbury & Co., of Boston, Mass., and Dr. C. B. Robbins, of Worcester, Mass.

No. 2.—Sample of dry isinglass or glue manufactured by the Gloucester Isinglass and Glue Company, under John S. Rogers' patent process, from salt fish skins, used for the manufacture of leather belting, card belting, and roll cots. See samples No. 8, from J. S. Ambrose & Co., of Boston, Mass.; No. 18, sample from Shultz Belting Company, St. Louis, Mo.; No. 9, sample from Underwood Belting Company, Tolland, Conn.; No. 19, sample from W. F. Forepaugh, Jr., & Bro., Philadelphia, Pa.; No. 20, sample of leather belting, from I. B. Williams & Son, Dover, N. H.; No. 11, sample case of roll-cots from C. B. Bradley, Manchester, N. H.

No. 3.—Sample of dry fish skins as prepared by the Gloucester Isinglass and Glue Company, under J. S. Rogers' patent process, from salt fish skins, for the manufacture of dry isinglass glue and liquid isinglass.

No. 4.—Samples of thick liquid isinglass, manufactured by the Gloucester Isinglass and Glue Company, under J. Rogers' patent process, used for leather belting, roll-cots, &c. See sample work No. 10, T. K. Earle & Co., Worcester, Mass., also H. W. Ladd, of Boston, Mass. Warranted to keep sweet one year in liquid form.

No. 5.—Sample of liquid isinglass for adhesive paper, manufactured by the Gloucester Isinglass and Glue Company, under John S. Rogers' process. See sample of work, labels and book, No. 12, Henry H. Woodbury & Co., Woodstock, Vt.; gummed paper, No. 13, from George W. Brooks, No. 15 Kilby street, Boston, Mass. Samples of work, No. 16, done by the Dennison Manufacturing Company, No. 19 Milk street, Boston, Mass., gum paper, gum label, &c.

Sample of work, No. 17, scrap-books and letter file, from D. Slote & Co., Nos. 119 and 121 William street, New York City.

No. 6.—Sample of isinglass mucilage, manufactured by the Gloucester Isinglass and Glue Company, for adhesive purposes. Price 50 cents per quart, \$1.25 per gallon, warranted to keep one year.

PREPARED FROM FISH-SKINS.

32726. Exhibit of Gloucester Isinglass and Glue Co.—Continued.

No. 7.—Sample of stock before prepared, as used by the Gloucester Isinglass and Glue Company.

39445. Glue made from the heads of cod-fish. (*Gadus morrhua*.) Benjamin Robinson, East Gloucester, Mass.

Exhibit of fish glues. Russia Cement Company, Rockport, Mass.

13. GELATINE.

Prepared from Carrageen or Irish Moss (*Chondrus crispus*.)

32722. Specimens of Irish Moss (commercial). C. A. Cole, Scituate, Mass.

a. Moss as it comes from the rocks.

b. “ partly bleached.

c. “ bleached for market.

14. SPONGES.¹

SPECIMENS OF AMERICAN COMMERCIAL SPONGES (with the different grades, and bleached sponges).

32691. Yellow sponge (*S. agaricina*, Pall., sub. sp. *corlosia*, D. & M., var. *fusca*). Apalachicola, Fla. Silas Stearns.
32690. Yellow sponge (*S. agaricina*, Pall., sub. sp. *corlosia*, D. & M., var. *fusca*). Apalachicola, Fla. Silas Stearns.
32692. Yellow sponge (*S. agaricina*, Pall., sub. sp. *corlosia*, D. & M., var. *fusca*). Apalachicola, Fla. Silas Stearns.
32684. Sheep's-wool sponge (*S. equina*, Schm., sub. sp. *gossypina*, D. & M., var. *alba*). Apalachicola, Fla. Silas Stearns.
32688. Grass sponge (*S. equina*, Schm., sub. sp. *cerebriformis*, D. & M., var. *caliciformis*). Apalachicola, Fla. Silas Stearns. (Of no commercial value.)
31686. Grass sponge (*S. equina*, Schm., sub. sp. *cerebriformis*, D. & M., var. *caliciformis*). Apalachicola, Fla. Silas Stearns. (Of no commercial value.)
32677. “Sea-cap” sponge (*Hiscinia campana*, Udo., var. *typica*, A. H.). Apalachicola, Fla. Silas Stearns. (Of no commercial value.)
32685. Yellow sponge (*S. agaricina*, Pall., sub. sp. *corlosia*, D. & M., var. *fusca*). Apalachicola, Fla. Silas Stearns.
32668. Bahama yellow sponge (*S. agaricina*, Pall., sup. sp. *corlosia*, var. *fusca*). Very coarse sup. variety. A. Isaacs & Co., New York.
32680. Bahama dark color reef sponge (*S. officinalis*, Linn., sub. sp. *tubulifera*, D. & M., *disciformis*). A. Isaacs & Co., New York.
32665. Bahama light color reef sponge (*S. officinalis*, Linn., sub. sp. *tubulifera*, var. *rotunda*). A. Isaacs & Co., New York.
32652. Florida sheep's wool sponge (*S. equina*, Schm., sub. sp. *gossypina*, var. *alba*). A. Isaacs & Co., New York.
32674. Florida honey-comb sponge (*S. equina*, Schm., sub. sp. *cerebriformis*, var. *caliciformis*). A. Isaacs & Co., New York.
- . Bahama honey-comb sponge (*S. equina*, Schm., sub. sp. *cerebriformis*, var. *plana*). A. Isaacs & Co., New York.
32658. Island of Cuba sheep's wool sponge (*S. equina*, Schm., sub. sp. *gossypina*, D. & M., var. ——). A. Isaacs & Co., New York.

SPECIMENS OF AMERICAN COMMERCIAL SPONGES (with the different grades, and bleached sponges).

32670. Bahama sheep's wool sponge (*S. equina*, Schm., sub. sp. *gossypina*, var. *alba*). A. Isaacs & Co., New York.
32677. Bahama velvet sponge (*S. equina*, Schm., sup. sp. *mandriniformis*, D. et M.). A. Isaacs & Co., New York.
32664. Large Bahama globe sponge (*S. officinalis*, Linn., sup. sp. *tubulifera*, var. *disciformis*). A. Isaacs & Co., New York.
32676. Florida sheep's wool sponge (*S. equina*, Schm., sub. sp. *gossypina*, var. *solitaria*). A. Isaacs & Co., New York.
32661. Bahama dark color reef sponge (*S. officinalis*, Linn., sup. sp. *tubulifera*, D. et M., var. *rotunda*). A. Isaacs & Co., New York.
32671. Bahama honey-comb sponge (*S. equina*, Schm., sub. sp. *cerebriformis*, var. *obscura*). A. Isaacs & Co., New York.
32666. Bahama light color reef sponge (*S. officinalis*, Linn., sup. sp. *tubulifera*, var. *disciformis*). A. Isaacs & Co., New York.
32682. Bahama sheep's-wool sponge (*S. equina*, sup. sp. *gossypina*, var. *hirtuta*). A. Isaacs & Co., New York.
32654. Island of Cuba sheep's-wool sponge (*S. equina*, Schm., sup. sp. *gossypina*, var. *alba*). A. Isaacs & Co., New York.
32655. Bahama dark color reef sponge (*S. officinalis*, Linn., sub. sp. *tubulifera*, D. & M., var. *rotunda*).
32653. Bahama sheep's-wool sponge (*S. equina*, Schm., sup. sp. *gossypina*, var. *alba*). A. Isaacs & Co., New York.
32683. Sponge (*S. equina*, Schm., sup. sp. *gossypina*, D. & M., *barbara*). A. Isaacs & Co., New York.
32667. Florida honey-comb sponge (*S. equina*, Schm., sup. sp. *cerebriformis*, var. *caliciformis*). A. Isaacs & Co., New York.
32662. Large Bahama dog-head sponge (*S. agaricina*, Pall., sup. sp. *punctata*). A. Isaacs & Co., New York.
32660. Small Bahama dog-head sponge (*S. agaricina*, Pall., sup. sp. *punctata*). A. Isaacs & Co., New York.
32678. Florida sheep's-wool sponge (*S. equina*, Schm., sup. sp. *gossypina*, var. *alba*). A. Isaacs & Co., New York.
32681. Florida honey-comb sponge (*Spongia equina*, Schm., sup. sp. *cerebriformis*, D. & M., var. *caliciformis*). A. Isaacs & Co., New York.
32656. Florida yellow sponge (*S. agaricina*, sup. sp. *corlosia*, var. *fusca*). A. Isaacs & Co., New York.
32657. Bahama yellow sponge (*S. agaricina*, Pall., sup. sp. *punctata*, var. *densa*). A. Isaacs & Co., New York.
32663. Bahama velvet sponge (*S. equina*, Schm., sup. sp. *gossypina*, var. *barbara*). A. Isaacs & Co., New York.

Sponges used in surgery.

- 3213a. Sponge prepared for use as lint in surgery. Wm. B. Moses, Washington, D. C.

15. OILS AND FATS.

MAMMAL OILS.

Seal-oil, in its various grades, used for lubricating.

25979. Oil of harbor seal (*Phoca vitulina*). Capt. N. E. Atwood, Provincetown, Mass.

Sea-elephant oil.

39273. Natural sea-elephant oil (*Macrorhinus leonina*). Jasper Pryor, New York.

MAMMAL OILS.

Sea-elephant oil—Continued.

39274. Bleached sea-elephant oil (*Macrorhinus leonina*). Jasper Pryor, New York.
 25057. Oil of sea-elephant (*Macrorhinus*, sp.). Haven, Williams & Co., New London, Conn.
 25058. Oil of sea-elephant (*Macrorhinus leonina*). South Georgia Island. Haven, Williams & Co., New London, Conn.
 35548. Natural winter sea-elephant oil (*Macrorhinus leonina*).
 35549. Bleached winter sea-elephant oil (*Macrorhinus leonina*).

Oil from body of whales, grampuses, and porpoises used in the arts, for lubricating, painting, &c.

25054. Oil of humpback whale (*Megaptera*, sp.). Atlantic Ocean. Haven, Williams & Co., New London, Conn.
 25055. Oil of right-whale. Haven, Williams & Co., New London, Conn.
 25056. Oil of sulphur-bottom whale (*Sibbaldius*, sp.). Haven, Williams & Co., New London, Conn.
 26038. Oil of beluga (*Delphinapterus catodon*). Renfrew & Co., Quebec.
 39460. Oil from body of beluga (*Delphinapterus catodon*). Caleb Cook, Provincetown, Mass.
 39461. Oil from jaw of beluga (*Delphinapterus catodon*). Caleb Cook, Provincetown, Mass.
 24894. Crude arctic whale oil. George Delano & Co.
 39263. Crude whale oil, "northern." Jasper Pryor, New York.
 39264. Crude whale oil, "southern." Jasper Pryor, New York.
 39265. Natural whale oil. Jasper Pryor, New York.
 39266. Bleached whale oil. Jasper Pryor, New York.
 39279. Extra bleached whale oil. Jasper Pryor, New York.
 24895. Bleached "winter" sperm-oil, from the sperm-whale (*Physeter macrocephalus*). George Delano & Co., New Bedford, Mass.
 39282. Whale oil, "foots." Jasper Pryor, New York.
 25743. Oil of grampus (*Grampus griseus*). Extracted by exposure to the sun. E. E. Small, Provincetown, Mass.
 25737. "Pressed" oil of grampus (*Grampus griseus*). E. E. Small, Provincetown, Mass.
 25967. Oil of cowfish. Capt. N. E. Atwood, Provincetown, Mass.
 25958. Oil of porpoise. Marvin Brothers & Bartlett, Portsmouth, N. H.
 25738. Oil of porpoise (*Lagenorhynchus leucopleurus*). Extracted by exposure to the sun. E. E. Small, Provincetown, Mass.
 25974. Oil of porpoise (*Delphinus erebennus?*). Capt. N. E. Atwood, Provincetown, Mass.
 26037. Oil of harbor porpoise (*Phocæna americana*). Passamaquoddy Bay, Maine. George H. Peabody, Eastport, Me.
 25739. Oil of snuffer (*Phocæna americana*). Extracted by exposure to the sun. E. E. Small, Provincetown, Mass.
 39220. Bleached "winter" whale oil. J. H. Bartlett & Sons, New Bedford, Mass.
 39221. Crude "southern" whale oil. J. H. Bartlett & Sons, New Bedford, Mass.
 39223. Crude arctic whale oil. J. H. Bartlett & Sons, New Bedford, Mass.
 35550. Natural winter whale oil.
 35551. Bleached winter whale oil.

MMAL OILS.**Oil from whales and porpoises—Continued.**

39224. Whale oil "foots." J. H. Bartlett & Sons, New Bedford, Mass.
 26076. Oil of black-fish (*Globicephalus intermedius*). North American Oil Company, Wellfleet, Mass.
 25741. Oil of black-fish (*Globicephalus intermedius*). E. E. Small, Provincetown, Mass.
 25064. Refined oil of black-fish (*Globicephalus intermedius*). Cape Cod. Capt. Caleb Cook, Provincetown, Mass.
 25065. Double refined oil of black-fish (*Globicephalus intermedius*). Cape Cod. Capt. Caleb Cook, Provincetown, Mass.
 25977. Oil from body of black-fish (*Globicephalus intermedius*). Capt. N. E. Atwood, Provincetown, Mass.

Black-fish and porpoise-jaw oil used in lubricating fine machinery, watches, clocks, and guns, with specimens of blubber.

25742. Oil from head of black-fish (*Globicephalus intermedius*). Extracted by exposure to the sun. E. E. Small, Provincetown, Mass.
 25968. Oil from head of black-fish (*Globicephalus intermedius*). Sold as "porpoise-jaw oil." Capt. Caleb Cook, Provincetown, Mass.
 25984. Oil from head of black-fish (*Globicephalus intermedius*). Sold as "porpoise-jaw oil." Capt. N. E. Atwood, Provincetown, Mass.
 39436. Oil of black-fish (*Globicephalus intermedius*). A. W. Dodd & Co., Gloucester, Mass.
 25969. Oil from jaw of porpoise. Capt. N. E. Atwood, Provincetown, Mass.
 26035-6. Oil from head of harbor-porpoise (*Phocæna americana*). Passamaquoddy Bay. Geo. A. Peabody, Eastport, Me.
 25066. Jaw-oil of black-fish (*Globicephalus intermedius*). Cape Cod. Capt. Caleb Cook, Provincetown, Mass.
 39458. Watch oil. Caleb Cook, Provincetown, Mass.
 39459. Clock oil. Caleb Cook, Provincetown, Mass.

Grampus-oil used for lubricating fine machinery.

25733. Oil from head of grampus (*Grampus griseus*). Extracted by exposure to the sun. E. E. Small, Provincetown, Mass.

Sperm-oil used in lamps, for lubricating, as an emollient in medicine, for lip-salves, and in the manufacture of spermaceti.

39260. Crude sperm-oil from sperm-whale (*Physeter macrocephalus*). Jasper Pryor, New York.
 39261. Natural sperm-oil from sperm-whale (*Physeter macrocephalus*). Jasper Pryor, New York.
 39262. Bleached sperm-oil. From sperm-whale (*Physeter macrocephalus*). Jasper Pryor, New York.
 39217. Crude "body" sperm-oil from sperm-whale (*Physeter macrocephalus*). J. H. Bartlett & Sons, New Bedford, Mass.
 39218. Crude "head" sperm-oil from sperm-whale (*Physeter macrocephalus*). J. H. Bartlett & Sons, New Bedford, Mass.
 39219. Bleached winter sperm-oil from the sperm-whale (*Physeter macrocephalus*). J. H. Bartlett & Sons, New Bedford, Mass.
 35546. Natural winter sperm-oil.
 35547. Bleached winter sperm-oil.

MAMMAL OILS.

Spermaceti, with specimens of candles.

39253. Spermaceti. Jasper Pryor, New York.
 —. Spermaceti. J. H. Bartlett & Sons, New Bedford, Mass.
 39393. Patent sperm candles. (Size 6). Anthony Pirz, Long Island City, N. Y.
 39394. Sperm candles. Anthony Pirz, Long Island City, N. Y.

REPTILE OILS.

Alligator-oil manufactured in Florida.

2499. Oil of alligator (*Alligator mississippiensis*). Prepared by Col. L. A. Harden, Jacksonville, Fla. Dr. W. H. Babcock.

FISH OILS.

Sun-fish oil used by fishermen for cure of rheumatism.

32792. Oil from liver of sun-fish (*Mola rotunda*). Marvin Brothers & Bartlett, Portsmouth, N. H.
 25966. Oil from liver of sun-fish (*Mola rotunda*). Capt. N. E. Atwood, Provincetown, Mass.

Oil from liver of the cod family.

39275. Carriers' cod-liver oil (*Gadus morrhua*). Jasper Pryor, New York.
 39276. Medicinal cod-liver oil (*Gadus morrhua*). Jasper Pryor, New York.
 25982. Oil from liver of cod-fish (*Gadus morrhua*), crude. Capt. N. E. Atwood, Provincetown, Mass.
 25960. Liver-oil of cod-fish (*Gadus morrhua*). Marvin Brothers & Bartlett, Portsmouth, N. H.
 39435. Oil of Grand Bank cod-fish (*Gadus morrhua*). A. W. Dodd & Co., Gloucester, Mass.
 39434. Oil of George's Bank cod-fish (*Gadus morrhua*). A. W. Dodd & Co., Gloucester, Mass.
 32790. Pure cod-liver oil (*Gadus morrhua*). Marvin Brothers & Bartlett, Portsmouth, N. H.
 35554. Medicinal cod-liver oil.
 25985-39168. Medicinal oil from livers of cod-fish (*Gadus morrhua*). Capt. N. E. Atwood, Provincetown, Mass.
 39437. Medicinal oil from livers of cod-fish (*Gadus morrhua*). A. W. Dodd & Co., Gloucester, Mass.

Personal attention and the most scrupulous care is exercised, both in the selection of livers from which this oil is made and in the actual process of manufacture.

39166. Cold pressed refined medicinal oil from liver of the cod-fish (*Gadus morrhua*). Haskins Brothers, Boston, Mass.
 25961. Stearine from liver-oil of cod-fish (*Gadus morrhua*). Marvin Brothers & Bartlett, Portsmouth, N. H.
 25970. Oil from liver of cusk (*Brosimius brosme*). Capt. N. E. Atwood, Provincetown, Mass.
 25736. Oil from liver of hake (*Phycis chuss*). Extracted by exposure to the sun. E. E. Small, Provincetown, Mass.
 25732. Oil from liver of haddock (*Melanogrammus aeglefinus*). Extracted by exposure to the sun. E. E. Small, Provincetown, Mass.
 25978. Oil from liver of haddock (*Melanogrammus aeglefinus*). Capt. N. E. Atwood, Provincetown, Mass.

SH-OILS.

Oil from liver of the cod family—Continued.

25971. Oil from liver of pollock (*Pollachius carbonarius*). Capt. N. E. Atwood, Provincetown, Mass.
 25740. Oil from liver of pollock (*Pollachius carbonarius*). Extracted by exposure to the sun. E. E. Small, Provincetown, Mass.

Menhaden-oil used in currying leather, in rope making, for lubricating, for adulterating linseed-oil, as a paint-oil, and exported to Europe for use in the manufacture of soap and for smearing sheep.

39222. Crude menhaden-oil (*Brevoortia tyrannus*). J. H. Bartlett & Sons, New Bedford, Mass.
 39225. Menhaden-oil "foots." J. H. Bartlett & Sons, New Bedford, Mass.
 39267. Crude menhaden oil (*Brevoortia tyrannus*), medium light-colored. Jasper Pryor, New York.
 39268. Pressed menhaden oil (*Brevoortia tyrannus*), medium light-colored. Jasper Pryor, New York.
 39269. Crude menhaden oil (*Brevoortia tyrannus*), brown-colored. Jasper Pryor, New York.
 39270. Pressed menhaden oil (*Brevoortia tyrannus*), brown-colored. Jasper Pryor, New York.
 39271. Bleached menhaden oil (*Brevoortia tyrannus*), brown-colored. Jasper Pryor, New York.
 39272. Extra bleached menhaden oil (*Brevoortia tyrannus*), brown-colored. Jasper Pryor, New York.
 39277. Crude menhaden oil (*Brevoortia tyrannus*), extra light colored. Jasper Pryor, New York.
 39278. Pressed menhaden oil (*Brevoortia tyrannus*), extra light colored. Jasper Pryor, New York.
 39280. Menhaden-oil pressings.
 39281. Bleached menhaden-oil pressings. Jasper Pryor, New York.
 39439. Oil of pogie or menhaden (*Brevoortia tyrannus*). A. W. Dodd & Co., Gloucester, Mass.

Oil of other fishes.

25973. Oil of horse-mackerel (*Orcynus thynnus*). Capt. N. E. Atwood, Provincetown, Mass.
 25980. Oil from liver of mackerel-shark (*Isuropsis Dekayi*). Capt. N. E. Atwood, Provincetown, Mass.
 25975. Oil from liver of thresher-shark (*Alopias vulpes*). Capt. N. E. Atwood, Provincetown, Mass.
 25981. Oil from liver of dog-fish (*Squalus americanus*). Capt. N. E. Atwood, Provincetown, Mass.
 25976. Oil from liver of cramp-fish (*Torpedo occidentalis*). Capt. N. E. Atwood, Provincetown, Mass.
 42920. Oil from *Centroscyllium fabricii*, Greenland dog-fish. Chas. Ruckley, Gloucester, Mass.

Oulachan oil used by Indians of Northwest coast for food and illumination.

32778. Oulachan oil. J. G. Swan, Port Townsend, W. T.

Soaps made from fish-oil.

- Soap made from "chums" of menhaden. Mr. Charles Alden.

MOLUSK-OILS.

Oil of squid.

25972. Oil of squid (*Ommastrephes illecebrosa*). Capt. N. E. Atwood, Provincetown, Mass.

16. PERFUMES.**MAMMAL PERFUMES.**

Ambergris of sperm-whale, with specimens of ambreine.

39376. Ambergris (commercial). Weeks & Potter, Boston, Mass.

17. CHEMICAL PRODUCTS AND AGENTS EMPLOYED IN THE ARTS AND MEDICINE.**DERIVED FROM PLANTS.**

- Fluid extract of seawrack (*Fucus vesiculosus*). John Wyeth & Bro., Philadelphia, Pa.

Extensively sold under the name of "Antifat."

18. FERTILIZERS.**ARTIFICIAL GUANOS.****Menhaden guano.**

Series of preparations illustrating the manufacture of soluble Pacific guano. Soluble Pacific Guano Company, Wood's Holl, Mass.¹

26104. Crude South Carolina phosphate.
 26103. Crushed South Carolina phosphates.
 26102. Ground South Carolina phosphate.
 26100. Crude Navassa phosphate. Navassa Island, W. I.
 26101. Sicily sulphur, used in manufacture of sulphuric acid, used in factory.
 26099. Stassfurth kainite, used in preservation of scrap.
 26095. Crude menhaden scrap.
 26097. Menhaden scrap, dried by the Hogle patent drying-machine.
 26096. Soluble Pacific guano (unscreened).
 26098. Soluble Pacific guano (screened).

Other preparations.

26062. Ammoniated bone superphosphate. Geo. W. Miles, Milford, Conn.
 22246. Leopoldshall kainite. Winfield S. Dunan, Baltimore, Md.
 39284. Dried unground fish guano. Jasper Pryor, New York.
 39285. Dried ground fish guano. Jasper Pryor, New York.
 39444. Guano made from salt-fish skins. Gloucester Isinglass and Glue Company, Gloucester, Mass.
 39438. Guano from head of halibut (*Hippoglossus vulgaris*). A. W. Dodd & Co., Gloucester, Mass.

SECTION F.

PROTECTION AND CULTURE.

I. INVESTIGATION.

(AS PROSECUTED BY THE UNITED STATES FISH COMMISSION.)

1. METHODS OF WORK.

Apparatus for collecting specimens. (See under B.)

Apparatus for physical research.

Thermometers used by Dr. J. H. Kidder in investigating the temperature of fishes at Provincetown, Mass. Manufactured by Tagliabue, N. Y.

32745. Standard thermometer.

32746. Set of six observation thermometers covering 30° to 100° F.

32747. Curved thermometer.

Appliances for measurement.

Scales for taking proportional measurements of fish, preparatory to writing descriptions.

Appliances for working up results.

Coast laboratories.

Photographs of the U. S. Fish Commission Biological Laboratory at Wood's Holl, Mass. Exterior and interior views. U. S. Fish Commission.

Photographs.¹

Headquarters of the United States Fish Commission, Wood's Holl, Mass.

Little Harbor of Wood's Holl, Mass., with headquarters of U. S. Fish Commission.

Harbor of Wood's Holl, Mass., from the wharf of the Fish Commission laboratory.

Harbor of Wood's Holl, Mass., with U. S. Fish Commission fleet for 1871.

Village of Wood's Holl, Mass., with the Pacific Soluble Guano Company's Works.

¹The photographs here enumerated are on exhibition. Many others are in possession of the Commission.

Photographs—Continued.

39471. United States steamer "Fish Hawk." Built by the Pusey & Jones Co., Wilmington, Del.
 Yacht "Mazeppa," employed in the service of the U. S. Fish Commission.
 U. S. steamer "Blue Light" at the wharf of the U. S. Fish Commission, Wood's Holl, Mass.
 Village of Wood's Holl, Mass., showing laboratory of U. S. Fish Commission.
 A series of photographs showing work of U. S. Fish Commission at the shad-hatching station in Albemarle Sound.

RESULTS OF WORK.

1. Publications of the Commission.

(A series of the separate papers, bound up by subjects, is also shown.)

1. Circular regarding tagged fish in Lake Michigan, 1871.
2. Memoranda of inquiry. 1872.
3. Questions; food-fishes. 1872.
4. Circular to accompany No. 3. 1872.
5. Statistics; menhaden fisheries; circular, 1873.
6. Report. Part I. 1873.
7. Report. Part I, with supplement.

1873. BAIRD, SPENCER F.

42d Congress, } Senate. { Mis. Doc. | ——— | United States Com-
 2d session. } No. 61. | ——— | mission of Fish and
 Fisheries. | —Part 1.— | Report | on the | condition of the sea
 fisheries | of the south coast of New England | in | 1871 and
 1872, | by | Spencer F. Baird, Commissioner. | — | With supple-
 mentary papers. | — | Washington: | Government Printing Of-
 fice. | 1873. (8vo., pp. xlvii, 852, plates xxxviii, with 38 leaves
 explanatory to plates, 2 maps.)

The report of the Commissioner, without supplementary papers, pp. xlvii, was issued separately in advance. Title page the same.

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1874. BAIRD, SPENCER F.

United States Commission of Fish and Fisheries. | Part II. | Report
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into the decrease of the food-fishes. | B.—The propagation of food-
fishes in the waters | of the United States. | — | With supple-
mentary papers. | Washington: | Government Printing Office. |
1874. [8vo. pp. CII, 808, pls. xxxvii, 4 maps.]

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1878. BAIRD, SPENCER F.

United States Commission of Fish and Fisheries. | — | Part IV. | — |
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 food-fishes in the waters of the United States. | — | Washing-
 ton: | Government Printing Office. | 1878. 8vo., pp. ix, 50*, 1029,
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44. Prospectus of investigation. 1879, August.	
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50. Fixtures for salmon hatching. F. C. Report, Part 6. 1879, October.	
51. Coast town index. 1879, October.	
52. Hectograph letter to Rhode Island postmasters. 1879, November.	
53. The river fisheries. 1879, October.	
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56. Property record. 1879, October.	
57. Measurements of fishes, old.	
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59. Questions relating to the menhaden (hektograph) (two forms). 1879, November.	
60. Scale for fish measure. 1879, December.	
61. Record of observations at hatching stations, old.	
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RESULTS OF WORK.

1. Publications of the Commission—Continued.

69. Record of ocean temperatures for use on mackerel and menhaden vessels. 1880, February.
70. Edmonds' circular to Maryland oyster dealers and Baltimore fish dealers (two forms). 1880, February.
71. Hektograph letter to postmasters about imperfect returns. 1879, December.
72. Supplement to 41 (hektograph). 1879, December.
73. Fish-guano letter to postmasters (hektograph). 1879, December.
74. Inquiry for coast-town addresses (hektograph). 1880, January.
75. Inquiry for coast towns (hektograph). 1880, February.
76. Blank form; expenses tenth census of the United States; statistics of the fisheries.
77. Menhaden fishery marine (two forms). 1880, February.
78. Berlin shipping list. 1880, February 20.
79. Letter in regard to Berlin exhibits. 1880, February 25.
80. Letter in regard to New York markets (Phillips). 1880, February.
81. Railroad circular. 1880, February.
82. Manufacturers' circular. 1880, February.

b. Collections.

PHOTOGRAPHS.

See series of photographs and color-sketches of North American fishes.

UPWARDS OF EIGHT HUNDRED CASTS of coast and fresh-water species.

(See under A, V to VIII.)

c. Active work in fish culture.

MAP SHOWING THE OPERATIONS OF THE U. S. FISH COMMISSION FROM 1871 TO 1879, AND THE LOCATIONS OF ALL STATIONS OF THE UNITED STATES AND STATE FISH COMMISSIONS, AND THE DATES OF ESTABLISHMENT OF THE VARIOUS STATE COMMISSIONS.*

Explanations.

The locations where young fish have been planted are shown by the following symbols:

- "Triangle, red," Atlantic salmon (*Salmo salar*).
- "Square, red," Sebago salmon (*Salmo sebago*).
- "Circle, red," Quinnot salmon (*Salmo quinnat*).
- "Cross, red," whitefish (*Coregonus albus*).

* These details are laid down upon the outline map of the United States and other portions of North America, prepared for the Smithsonian Institution (1875), by W. L. Nicholson, topographer, Post-Office Department, on a scale of 16 miles to the inch (1:1,013,760), in twenty sheets, covering an area of 16½ feet long (horizontally) by 15 feet wide (vertically).

The sheets of this map were originally prepared to serve as a basis for showing the

"Trefoil, blue," shad (*Alosa sapidissima*).

"Diamond, green," carp (*Cyprinus carpio*).

"Maltese cross," stations for hatching or investigation.

The date of the establishment of each State commission is indicated by conspicuous figures.

The locations of stations are indicated by conspicuous numbers, the explanation of which is given in the following table:

LIST OF HATCHING AND ZOOLOGICAL STATIONS.

- 1.—U. S. Zoological Station Eastport, Me., 1872.
- 2.—U. S. Zoological Station, Portland, Me., 1873.
- 3.—U. S. Hatching Station, Grand Lake Stream, Maine. *Salmo sebago*.
- 4.—U. S. Hatching Station, Bucksport, Me. *Salmo salar*.
- 5.—U. S. Zoological Station, Gloucester, Mass., 1878.
- 5.—U. S. Hatching Station, Gloucester, Mass., *Gadus morrhua*.
- 6.—U. S. Zoological Station, Salem, Mass., 1877.
- 7.—U. S. Zoological Station, Provincetown, Mass., 1879.
- 8.—U. S. Zoological Station, Wood's Holl, 1871-'75.
- 9.—U. S. Zoological Station, Noank, Conn., 1874.
- 10.—U. S. Hatching Station, Holyoke, Mass. *Alosa sapidissima*.
- 11.—U. S. Hatching Station, Baltimore, Md. *Cyprinus carpio*.
- 12.—U. S. Hatching Station, Havre de Grace, Md. *Alosa sapidissima*.
- 13.—U. S. Hatching Station, Washington, D. C. *Cyprinus carpio*.
- 14.—U. S. Hatching Station, Freestone Pt., Va. *Alosa sapidissima*.
- 15.—U. S. Hatching Station, Avoca, N. C. *Alosa sapidissima*.
- 16.—U. S. Hatching Station, Baird, Cal. *Salmo Quinnat*.
- 17.—U. S. Hatching Station, near Baird, Cal. *Salmo irideus*.
- 18.—U. S. Hatching Station, Clackamas River, Oregon. *Salmo quinnat*.
- 19.—U. S. Zoological Station, Halifax, N. S., 1877.
- 20.—Maine Hatching Station, Rangeley Lake.
- 21.—New Hampshire Hatching Station at Plymouth.
- 22.—Massachusetts Hatching Station at Winchester.
- 23.—New York Hatching Station at Caledonia.
- 24.—New York Hatching Station at Coxsackie. *Alosa sapidissima*.
- 25.—Pennsylvania Hatching Station at Marietta.
- 26.—Pennsylvania Hatching Station at Corry (Erie County).

larger features of the physical geography and other statistics of the United States, to accompany some of the governmental exhibits in the International Exhibition of 1876, at Philadelphia, wherein are deposited several of these maps by the Smithsonian Institution, the Agricultural Department, the Light-House Board, and the Post-Office Department.

The entire map extends from the southern shores of Lake Winnipeg and Hudson's Bay to the parallel of 15°—taking in the whole of the Gulf of Mexico, Yucatan, and the larger West India Islands.

From east to west it includes parts of Nova Scotia and of Vancouver Island.

The territory of Alaska is shown on a smaller scale, detached, in a vacant corner of the map.

The details are restricted to the general features—the shore-lines of the oceans and great lakes, the principal rivers, State and international boundaries, and a few of the larger cities. The mountain-topography is not (litho-printed) on the sheets, but added by hand—the meridians and parallels being laid down from a computed projection.

- 27.—Maryland Hatching Station at Baltimore.
 28.—Virginia Hatching Station, head of Rappahannock River. *Alosa sapidissima*.
 29.—Virginia Hatching Station at Berkeley.
 30.—North Carolina Hatching Station at Morganton.
 31.—Ohio Hatching Station at Toledo. *Coregonus albus*, etc.
 32.—Michigan Hatching Station at Niles.
 33.—Michigan Hatching Station at Detroit. *Coregonus albus*.
 34.—Wisconsin Hatching Station at Milwaukee. *Coregonus albus*.
 35.—Wisconsin Hatching Station at Madison.
 36.—Iowa Hatching Station at Anamosa.
 37.—Utah Hatching Station at Salt Lake.

II. PROTECTION.

1. GAME LAWS. (See reports.)

2. FISH-WAYS.

GROOVE FISH-WAYS.

15355. Model of fish-way. James D. Brewer, inventor, Muncy, Lycoming County, Pa. In this fish-way the water runs in a zigzag groove which breaks its force without the formation of eddies. Patented.
 26106. Smaller model of the above.

BOX, STEP, OR POOL FISH-WAYS.

26107. Model of fish-way. James D. Brewer, Muncy, Pa. Patented by Daniel Steck. In this the water is retarded in its descent by means of transverse sloping floors.

INCLINED FISH-WAYS WITHOUT STEPS.

29283. Model of old Pennsylvania fish-way. Built at Columbia, on the Susquehanna River, in 1866. Designed by James Worrall. Scale, $\frac{1}{4}$ inch to the foot. C. G. Atkins, Bucksport, Me.
 29284. Model of old Pennsylvania fish-way. Built at Columbia, on the Susquehanna River, in 1873. Designed by James Worrall. Scale, $\frac{1}{4}$ inch to the foot. C. G. Atkins, Bucksport, Me.

With partitions at right-angles.

29291. Model of rectangular return fish-way. Scale, $\frac{1}{4}$ inch to the foot. C. G. Atkins, Bucksport, Me.
 26937. Model of the fish-way over the dam at Holyoke, Mass., on the Connecticut River. Patented by E. A. Brackett, Winchester, Mass. Scale, $\frac{1}{4}$ of an inch to the foot ($\frac{1}{96}$). Model by C. G. Atkins. A submerged piece of cob-work surmounted by a grating serves to turn the fish into the fish-way. It carries a column of water 2 feet wide and 2 feet deep which reaches the bottom with no perceptible increase in velocity, the current being less than 2 miles an hour. Height of the dam, 30 feet; length of the fish-way, 440 feet; the incline, 1 in 15.

INCLINED FISH-WAYS WITHOUT STEPS.

With partitions placed obliquely.

29287. An adaptation of Foster's fish-way. Designed by C. G. Atkins, and built at Pembroke, Me. Scale, $\frac{1}{2}$ inch to the foot. C. G. Atkins, Bucksport, Me.
29286. Model of Foster's fish-way. Invented by H. H. Foster, East Machias, Me. Scale, $\frac{1}{2}$ inch to the foot. C. G. Atkins, Bucksport, Me.
29288. Model of oblique fish-way. Invented by Alfred Swazey, Bucksport, Me., in 1876. Scale, $\frac{1}{2}$ inch to the foot. C. G. Atkins, Bucksport, Me.
29289. Swazey's oblique fish-way. Invented by Alfred Swazey, Bucksport, Me., in 1874. Scale, $\frac{1}{2}$ inch to the foot. C. G. Atkins, Bucksport, Me.
26939. Model of the fish-way at Lawrence, Mass., on the Merrimack River. Scale, $\frac{1}{2}$ inch to the foot ($\frac{1}{16}$). C. G. Atkins.

With rectangular compartments.

26937. Model of rectangular compartment fish-way on the inclined-plane system, in an extended arrangement. Scale, $\frac{1}{2}$ inch to the foot ($\frac{1}{4}$). C. G. Atkins.

SPIRAL FISH-WAYS.

26931. Model of Pike's spiral fish-way, devised by Hon. R. G. Pike, of Connecticut. Scale, $\frac{1}{2}$ inch to the foot ($\frac{1}{24}$). C. G. Atkins.
26949. Model of rectangular compartment fish-way on the inclined-plane system, in spiral arrangement, devised by Charles G. Atkins, of Bucksport, Me., in imitation of Pike's spiral fish-way. Scale, $\frac{1}{2}$ inch to the foot ($\frac{1}{4}$). C. G. Atkins. Showing the great economy of space and material effected by the spiral arrangement. Further advantages of the spiral arrangement are the facility with which water can be admitted at different heights of the river, and contiguity of the outlet to the dam secured, so that the fish will readily find it.
39306. Model of the fish-way at Bangor, Me., on the Penobscot River; designed by Charles G. Atkins, and built by the city of Bangor in 1877 at a cost of \$6,000. Scale $\frac{1}{2}$. Height of the dam 16 feet (4.1 meters).
39497. Model of fish-way. Designed by B. F. Shaw, State fish commissioner, Anamosa, Iowa.

MOVING FLOAT FISH-WAYS.

26930. Model of Everleth's fish-way, devised by F. M. Everleth, M. D., of Waldoboro', Me. Scale, $\frac{1}{2}$ inch to the foot ($\frac{1}{4}$). C. G. Atkins.
- The peculiarity of this fish-way is the movable attachment at the upper end, which, by its own buoyancy, rises and falls with the fluctuations of the river, thus insuring that the entrance shall always be at the right height to admit the requisite quantity of water.

MOVING FLOAT FISH-WAYS.

With counter-currents from below.

32651. Working model of the McDonald fish-way. By M. McDonald, Lexington, Va. Patented. This fish-way is constructed upon the principle of having three sets of transverse partitions sloping upward. The water passing through the sluice from the dam tends to sink in the middle line of buckets, and emerges at the sides at a lower level, being checked by abutting against other partitions placed below them at right angles which deflect the water up stream, and these currents from below operate as retarders to the fall of the water from above. One has just been constructed on the Savannah River, Ga., which has an inclination of one foot in three.

III. PROPAGATION.

DEVICES USED IN OBTAINING AND IMPREGNATING OVA.

42936. Model of natural spawning race, invented by Stephen H. Ainsworth, West Bloomfield, N. Y. Not patented. This device consists of two sets of frames covered with wire-cloth, placed in two layers; the upper one has meshes coarse enough to allow the eggs to pass through, and is covered with coarse gravel in which the fish make nests and spawn. The upper screens are then lifted and the ova taken from the lower ones. S. H. Ainsworth.
42937. Pans used in catching the eggs of fish when taken by hand. They remain in these until impregnation has taken place.
42938. Dipper used for supplying water to the impregnating pans and in the transfer of fry.

HATCHING-HOUSES.

26940. Model of hatching-house at United States salmon-breeding station at Bucksport, Me. Scale, $\frac{1}{4}$ inch to the foot ($\frac{1}{16}$). C. G. Atkins. The hatching-troughs are arranged in sets of four across the building, and fitted with Brackett trays. The water enters them from a feed-trough along the side of the room and escapes by pipes through the floor.
42811. Model of the Druid Hill hatching-house Druid Hill Park, Baltimore. Built in 1875, by the city of Baltimore, under the direction of Major T. B. Ferguson, State commissioner of fisheries, at a cost of \$7,000. The building is of blue stone, with white granite trimmings; the center 18 $\frac{1}{2}$ by 33 feet, is two stories high, and on either side are octagonal wings 14 $\frac{1}{2}$ by 20 feet, whose sides are almost entirely of glass. The greatest amount of light and air is admitted through these and two large windows in the gable end of the main buildings; the inner door of the vestibule is also of glass. The windows are all furnished with dark green water-proof curtains, to exclude the sun and light when desirable. The water is supplied from a strong spring on the side of the hill near by, and is piped into the filtering tank which is just below the ceiling of the hatching room, which occupies the first floor of the building. The supply pipe is so arranged

HATCHING-HOUSES.

42811. Model of Druid Hill hatching-house, &c.—Continued.

with valves that the water can be conducted into the ponds below the house without entering the filtering tank should it be desirable. The water after passing through a series of flannel filters is discharged from the filtering tank into a reservoir tank of the capacity of about twelve hundred gallons. From this tank the water is piped under the floor, which is a Schillenger pavement, to the several hatching troughs, and to the tables in the octagonal extensions. These pipes are admirably arranged with stop-cocks, so that any portion of the apparatus can be operated without regard to the rest of the building.

In addition to the supply from the spring there are pipes by means of which an unlimited amount of water can be thrown into the filtering tank or ponds from the high service reservoir which is on the hill to the west of the hatching house. The water from the reservoir being influenced by the temperature of the atmosphere, and that from the spring being invariable, by mixing different proportions, the temperature of the water used can be either raised or diminished at will. The pipes which conduct the water to the tables on which the Ferguson jars are operated, are furnished with $\frac{1}{4}$ -of-an-inch spigots, over which rubber tubes are slipped, for the purpose of introducing water into the jars.

On the floor of the house is arranged the following apparatus:

- A. Ferguson jars.
- B. Flights of Coste tray.
- C. Troughs of Williamson's patent.
- D. Troughs of N. W. Clark's patent.
- E. Green & Holton hatching box.
- F. Aquarium.
- G. Reservoir tank.
- H. Porcelain-lined sinks.

In this house have been hatched:

- 2,497,140 California salmon.
- 89,881 land-locked salmon.
- 331,980 brook trout.

HATCHING-TROUGHS AND BOXES, STATIONARY.

39498. Model of the first hatching-box used in America, by Dr. Theodatus Garlick, in the year 1853. Dr. T. Garlick, Bedford, Ohio.

26936. No. 20. Model of hatching-troughs and trays in use at the United States salmon-breeding stations at Bucksport and Grand Lake Stream, Me. Scale, full size. C. G. Atkins.

The eggs to be hatched are placed on the wire-cloth trays.

42812. Model of Clark's hatching-box for all the salmonidæ. The eggs are placed upon the screens and the water flows in from above and out below. Patented by N. W. Clark. F. N. Clark, Northville, Mich.

42934. Model of the Holton hatching-box for all the salmonidæ. The eggs are placed upon all the screens except the top one, and the water flows in from below and out at the top. Patented by Marcellus Holton. Seth Green, superintendent, New York.

HATCHING-TROUGHS AND BOXES, STATIONARY.

39111. Holtou box (without the frames), which has been in use. S. Green, Rochester, N. Y.
42935. Hatching trough, used at the United States hatching-house at Grand Lake Stream, Me. C. G. Atkins.
22247. A circular-shaped hatching can of tin, designed by F. Mather, which led to the adoption of the following:
26995. Shad-hatching cone, with screen at the bottom, devised by Charles F. Bell and Fred. Mather. U. S. Fish Commission.
39112. Frame and screen used for hatching lake trout, *Cristivomer namaycush*. M. A. Green, New York Fish Commission.
26956. Salmon-egg hatching-baskets. Devised by Livingston Stone for use in the McCloud River, California. The baskets do not rest on the bottom of the trough, and the water flows through them from the bottom and sides and out at the top. L. Stone, U. S. Fish Commission.
39103. Nest of trays for hatching-trough. Devised by Charles G. Atkins, Bucksport, Me. U. S. Fish Commission.
26935. Model of hatching-frame in use at Grand Lake Stream, adapted to use in a trough or in an open stream. Devised by C. G. Atkins. Scale, full size. C. G. Atkins.
- The eggs are placed on all of the trays except the upper one. The interstices, though too small for the escape of the eggs, permit a change of water, and when the frame is shut it confines the trays securely in place. U. S. Fish Commission.
39382. Grand Lake hatching-frame. For use in a trough or in an open stream. Adapted only to large fish-eggs, like those of salmon. Designed by Charles G. Atkins, assistant to the United States Commission of Fish and Fisheries in 1875, and since then in constant use in the Schoodic salmon-breeding establishment at Grand Lake Stream, Maine, U. S. A. When in use, the water flows through the frame horizontally. Not patented.
- The capacity of this frame is 35,000 eggs of salmon.
39142. Hatching-jars of glass, with self-picking screen. Invention of Oren M. Chase, Detroit, Mich.
- Five jars, full size. O. M. Chase. Michigan Fish Commission.
26998. The Ferguson hatching-jar. A glass jar with trays. The water flows in at the bottom and out at the top. T. B. Ferguson. U. S. Fish Commission.
39108. Glass jar with screens for hatching trout. Devised by Thomas B. Ferguson. U. S. Fish Commission.
39463. Miniature hatching-box, for hatching trout or any fish requiring running water. Arranged to place in the dwelling-house, or wherever water can be supplied by a pipe. Charlestown, N. H. Livingston Stone.
39464. Model of fish-nursery for raising young trout less than six months old. $\frac{1}{4}$ actual dimensions. Charlestown, N. H. Livingston Stone.
- Ferguson's improved conical hatcher, with removable top, used to prevent splashing. Also arrangement for easily removing bottom screen. Valve used when bottom screen is to be removed or eggs and young fish to be transferred. Furnished also with hook for lifting vessel from frame. T. B. Ferguson. U. S. Fish Commission.
39105. Another form of same, furnished with Clark's self-picking gate attachment. T. B. Ferguson, Baltimore, Md., and F. A. Clark, Northville, Mich. U. S. Fish Commission.

HATCHING-TROUGHS AND BOXES, STATIONARY.

39106. Reversible Plunging Can, for hatching fish eggs, now in use on the U. S. Steamer "Fish Hawk"—a part of the improvement in fish-hatching apparatus invented by T. B. Ferguson, Baltimore, Md. Patented. The ends are so arranged as to be easily removed, so that the can may be used as a hatcher or a transporting can by inserting either a wire-cloth or tin bottom. T. B. Ferguson. U. S. Fish Commission.
- Another form of same, furnished with trunnions by means of which it is swung in the frame of the conical hatcher when used for transporting fish in rough seas. (The tops are interchangeable with those of the conical hatchers.) T. B. Ferguson. U. S. Fish Commission.
39107. "Hanger," "Cam," and "Guides" for Ferguson's improvement in fish-hatching apparatus. In use on the U. S. Steamer "Fish Hawk" for imparting a vertical motion to the hatching-cans. Designed by T. B. Ferguson. U. S. Fish Commission.
39109. Ferguson hatching-jar. A glass jar, with trays. The water flows in at the bottom and out at the top. Provided with trays for hatching salmon. Designed by T. B. Ferguson. U. S. Fish Commission. (By the use of glass the growth of fungus is prevented, and every egg in the vessel can be seen at a glance.)

HATCHING-BOXES, FLOATING.

26903. Shad-hatching box. Invention of Seth Green, Rochester, N. Y. Patented. S. Green, New York Fish Commission.
26997. Model of the above. S. Green, New York Fish Commission.
39462. Shad-hatching box. Invention of Isaac H. Wright, Baltimore, Md.
26904. Shad-hatching box. Invention of E. A. Brackett, Winchester, Mass. Patented. E. A. Brackett, Massachusetts Fish Commission.
39101. Revolving shad hatcher, designed by Spencer F. Baird. U. S. Fish Commission.
39110. Semi-rotating hatchers. Hatching box for eggs of the codfish. Invention of H. C. Chester, Noank, Conn. U. S. Fish Commission.
39470. Mechanical fish-hatching apparatus. Invention of Joel C. Parker, Grand Rapids, Mich.

ADHESIVE-EGG APPARATUS.

39102. Model of box for hatching the smelt, *Osmerus mordax*. Devised by George Ricardo, Hackensack, N. J. One-half size. F. Mather. U. S. Fish Commission.

MODELS OF FLOATING HATCHING-HOUSES.

29103. Model of the U. S. Fish Commission Steamer "Fish Hawk." Built by the Pusey & Jones Company, Wilmington, Del. Length on water line, 146 feet 6 inches; breadth of beam (molded), 27 feet; depth of hold (amidships), 10 feet 9 inches; draft of water, 7 feet 6 inches; tonnage, 485.
29104. Model of the fish-hatching deck of the U. S. Fish Commission Steamer "Fish Hawk," built by the Pusey & Jones Company, Wilmington, Del. Scale, 2 inches to the foot.

ACCESSORIES TO THE HATCHING APPARATUS.

26915. Wooden nippers for removing dead eggs. F. Mather. U. S. Fish Commission.

ACCESSORIES TO THE HATCHING APPARATUS.

39113. Wooden nippers with wire loops, for removing dead eggs. M. A. Green. New York Fish Commission.
39114. Cleaning net for removing dead shad eggs and dead fish from troughs. M. A. Green. New York Fish Commission.
39114. Cleaning net for removing dead shad eggs and dead fish from troughs. T. B. Ferguson. U. S. Fish Commission.
39115. Hand net for removing fish from troughs. T. B. Ferguson. U. S. Fish Commission.
1681. Landing net for Carp. U. S. Fish Commission.
39116. Pans in use for taking and impregnating fish eggs. U. S. Fish Commission.
1795. Tin dipper in use for supplying water, etc. U. S. Fish Commission.
39118. Lamp or lantern. U. S. Fish Commission.

DEVICES FOR THE TRANSPORTATION OF FISH EGGS.

39311. Box used in sending salmon eggs from America to Europe. Ice chamber on top and air space on sides. F. Mather. U. S. Fish Commission.
39120. Box used in carrying fish eggs short distances. M. A. Green. New York Fish Commission.
39121. Box used in sending eggs of brook trout to Europe. James Annin, jr., Caledonia, N. Y.

APPARATUS USED IN THE TRANSPORTATION OF FISH.

26911. Milk can. U. S. Fish Commission.
1785. Tin water-bucket. U. S. Fish Commission.
26912. Rubber tube for siphon. U. S. Fish Commission.
1810. Strainer-tube for end of siphon. U. S. Fish Commission.
39124. Rubber tube for siphon. M. A. Green. New York Fish Commission.
39125. Strainer-tube for end of siphon. M. A. Green. New York Fish Commission.
39119. Wroten bucket.
1865. Ferguson's cylinder-can with adjustable top. T. B. Ferguson. U. S. Fish Commission.
29377. Conical tank. Stone & Hooper, Charlestown, N. H.
39117. Can for hatching shad eggs while in transit, by motion of the water caused by rolling of ship or railroad-car. Designed by F. Mather. U. S. Fish Commission.
39455. Can, with sponges, for self-aerating water by means of motion of a ship. Fred. Mather. U. S. F. C.

APPARATUS USED IN FEEDING FRY.

39127. Conical glass feeders which keep the food in motion. Presented to the city of Baltimore by Thomas Winans.

PREPARED FOOD FOR ADULT FISH.

32777. Packages of prepared food. W. Koehler, Hoboken, N. J.

MAPS, PHOTOGRAPHS, AND CHARTS.

39136. Two maps of the National Carp Ponds, at Washington, D. C. R. Hessel. U. S. Fish Commission.
39137. Map of the Druid Hill Carp Ponds, at Baltimore, Md. T. B. Ferguson. Maryland Fish Commission.

MAPS, PHOTOGRAPHS, AND CHARTS.

39138. Map of the United States reservation for fish-cultural purposes on the McCloud River, California. Livingston Stone. U. S. F. C.
39139. Map of the salmon-hatching works at Grand Lake Stream, Maine. Charles G. Atkins. U. S. Fish Commission.
39140. Series of photographs of shad hatching at Avoca, North Carolina. U. S. Fish Commission.
39141. Photograph of the salmon-hatching ranch on the McCloud River, California. Livingston Stone. U. S. Fish Commission.
- Photograph of the steam yacht "Lookout," showing equipment for shad-hatching on the bow. T. B. Ferguson. Maryland Fish Commission.
- Photograph of section of the same on a larger scale. T. B. Ferguson.
- Photograph of the U. S. Fish Commission steamer "Fish Hawk," taken from the vessel. U. S. Fish Commission.
- Photograph of the same, taken from the model No. 29103. U. S. Fish Commission.
- Photograph of the exterior of the "Fish Hawk," showing the plunging buckets in position. From sectional model No. 29104. U. S. Fish Commission.
- Photograph from the same model, showing the anterior end of the hatching-deck. U. S. Fish Commission.
- Photograph showing the posterior end of the hatching-deck from nearly the level of the deck.
- Photograph taken from above the level of the deck.
- Photograph of the exterior of Druid Hill hatching-house. T. B. Ferguson.
- Photograph of interior of the same. T. B. Ferguson.
- Photograph showing three hatching-jars. T. B. Ferguson.

ENEMIES OF THE FISH CULTURIST.

39134. Stuffed trout and the water insect, *Belostoma grandis*, which killed it. From the ponds of H. D. McGovern, Brooklyn, N. Y.
39135. Specimens of newts or salamanders, crawfish, "millers' thumbs" (*Uranidea* sp.), and stickle-backs from Caledonia Creek. Seth Green. New York Fish Commission. (See also under section 1 of this catalogue.)

EGGS OF SALMONIDÆ IN PROCESS OF HATCHING.

39122. Five thousand eggs of the brook trout, *Salvelinus fontinalis*, from the ponds of James Annin, jr., Caledonia, N. Y.
39347. Salmon eggs (land locked). 1 case. Bucksport, Me. Charles G. Atkins.

EGGS OF SALMONIDÆ IN ALCOHOL.

39124. Samples of eggs of the brook trout, *S. fontinalis*, at different ages, from the New York State hatchery at Mumford, N. Y. New York Fish Commission.

No. 1. 20 days old.

2. 30 " "
3. 40 " "
4. 50 " "
5. 60 " "
6. 70 " "
7. 80 " "
8. 85 " "

EGGS OF SALMONIDÆ IN ALCOHOL.

39126. Eggs of the lake trout, *Cristiomer namaycush*, 85 days old. New York Fish Commission.
39145. Eggs of the California mountain trout, Rainbow trout, *Salmo irideus*, two days old. New York Fish Commission.
39465. California salmon. (*Oncorhynchus quinnat.*) A series of eggs and young salmon preserved in vials, and showing the change in the eggs and the growth of the fish from the time the egg is taken from the parent till the young fish is fully formed; showing daily growth for 100 days. Livingston Stone.

SPECIMENS OF FRY OF SALMONIDÆ IN ALCOHOL.

39146. Fry of lake trout, *Cristivomer namaycush*.
 No. 1. 1 day old.
 2. 15 days "
 3. 30 " "
 4. 35 " "
 New York Fish Commission.
39147. Fry of brook trout, *Salvelinus fontinalis*.
 No. 1. 1 day old.
 2. 10 days "
 3. 20 " "
 4. 30 " "
 5. 40 " "
 New York Fish Commission.

EGGS OF AMERICAN FISHES IN GENERAL.

Exhibited by the U. S. National Museum.

- Lophius piscatorius* Linn.—Goose Fish; Angler.
Chilichthys turgidus (Mitch.) Gill.—Swell-Fish.
Alutera Schoepfii (Walb.) Goode & Bean.—File Fish.
Pseudopleuronectes americanus (Walb.) Gill.—Flat Fish; Winter Flounder.
Pleuronectes glaber (Storer) Gill.—Flounder.
Glyptocephalus cynoglossus (Linn.) Gill.—Pole Flounder.
Lophopsetta maculata (Mitch.) Gill.—Watery Flounder; Spotted Turbot.
Chaenopsetta ocellaris (DeKay) Gill.—Common Flounder.
Chaenopsetta oblonga (Mitch.) Gill.—Four-spotted Flounder.
Hippoglossus americanus Gill.—Halibut.
Pollachius carbonarius (Linn.) Bon.—Pollock.
Gadus morrhua Linn.—Codfish.
Microgadus tomcodus (Walb.) Gill.—Tom Cod; Frost-fish.
Melanogrammus aeglefinus (Linn.) Gill.—Haddock.
Phycis chuss (Walb.) Gill.—Hake.
Phycis tenuis (Mitch.) DeKay.—Squirrel Hake.
Lota maculosa (Les.) Rich.—Burbot.
Merluccius bilinearis (Mitch.) Gill.—Whiting; Silver Hake.
Zoarces anguillaris (Peck) Storer.—Eel Pout.
Batrachus tau Linn.—Toad Fish; Oyster-fish.
Cyclopterus lumpus Linn.—Lump-fish.
Prionotus carolinus (Linn.) Cuv. & Val.—Broad-fingered Sea Robin.
Cottus grænlandicus Cuv. & Val.—Greenland Sculpin.
Hemirhamphus americanus (Gmel.) Cuvier.—Sea Raven.
Tautoga onitis (Linn.) Günther.—Tautog; Black-fish.
Xiphias gladius Linn.—Sword-fish.
Scomber scombrus Linn.—Mackerel.

EGGS OF AMERICAN FISHES IN GENERAL.

Exhibited by U. S. National Museum—Continued.

- Sarda pelamys* (Linn.) Cuv.—Bonito.
Cybium maculatum (Mitch.) Cuv.—Spanish Mackerel.
Poronotus triacanthus (Peck) Gill.—Harvest-fish; Butter-fish.
Cynoscion regalis (Bl.) Gill.—Squeteague; Weak-fish.
Pogonias chromis Lacep.—Drum.
Menticirrus nebulosus (Mitch.) Gill.—King-fish.
Stenotomus argyrops (Linn.) Gill.—Scuppaug; Scup; Porgy.
Stizostedium canadense (Smith) Jordan.—Canada Pike-perch.
Centropristis atrarius (Linn.) Barn.—Sea Bass.
Roccus lineatus (Schn.) Gill.—Striped Bass; Rock-fish.
Pomatomus saltatrix (Linn.) Gill.—Blue-fish.
Elacate canadus (Linn.) Gill.—Cobia; Crab-eater.
Leptecheneis naucrateoides (Zuiew.) Gill.—Remora; Sucker-fish
Esox nobilior Thompson.—Muskellunge.
Fundulus pisculentus (Mitch.) Val.—Mummichog.
Osmorus mordax (Mitch.) Gill.—Smelt; Frost-fish.
Coregonus clupeiformis (Mitch.) Milner.—White-fish.
Argyrosomus artedi (Les.) Hoy.—Herring; White-fish.
Salmo salar Linn.—Salmon.
Salmo salar var. *sebago* Girard.—Sebago Salmon.
Oncorhynchus quinnat (Rich.) Günther.—Quinnat or Sacramento Salmon.
Cristivomer namaycush (Penn.) Gill & Jordan.—Namaycush Trout; Lake Trout.
Cristivomer siscowet (Ag.) G. & J.—Siscowet.
Salvelinus fontinalis (Mitch.) Gill & Jordan.—Brook Trout.
Thymallus tricolor Cope.—Michigan Grayling.
Brevoortia tyrannus (Latr.) Goode.—Menhaden; Mossbunker; Pogie.
Aloea sapidissima (Wilson) Storer.—Shad.
Pomolobus pseudoharengus (Wilson) Gill.—Alewife; Fresh-water Herring; Gaspereau.
Clupea harengus Linn.—Herring; Sea Herring.

SPECIMENS OF FISH IN ALCOHOL.

39148. Hybrid between the California salmon, *Oncorhynchus quinnat* (male?), and the brook trout, *Salvelinus fontinalis* (female?). New York Fish Commission. Seth Green, Superintendent.

Fishes in alcohol. New York Fish Commission.

- Catostomus nigricans*.
Anguilla rostrata (Les.) DeKay.—Common Eel.
Amia calva Linn.—Mud-fish.
Lepidosteus osseus Linn.—Gar Pike.
Acipenser sturio Linn.—Sharp-nosed Sturgeon.
Acipenser brevirostris Les.—Short-nosed Sturgeon.

LITERATURE OF FISH CULTURE.

39129. NORRIS, THADDEUS.

American | Fish-culture | embracing all the details of | artificial breeding and rearing of trout; | the culture of salmon, shad and other | fishes. | By Thaddeus Norris, | Author of "The American Angler's Book." | Illustrated. | (Seal of the publishers.) | Philadelphia: | Porter & Coates. | London: Sampson Low, Son & Co. | 1874.

LITERATURE OF FISH CULTURE.

39130. GREEN, SETH.

Trout Culture, | by | Seth Green. | — | Published by Seth Green and A. S. Collins, | Caledonia, N. Y. | — | Rochester, N. Y.; | Press of Curtis, Morey & Co., Union and Advertiser Office. | 1870.

39133. GREEN, SETH, and ROOSEVELT, R. B.

Fish Hatching, | -and- | Fish Catching. | — | -by- | R. Barnwell Roosevelt, | Commissioner of Fisheries of the State of New York, Author of | Game Fish, etc., etc., | and | Seth Green, | Superintendent of Fisheries of the State of New York. | — | Rochester, N. Y.: | Union and Advertiser Co.'s Book and Job Print. | 1879.

39132. SLACK, J. H.

Practical | Trout Culture. | By | J. H. Slack, M. D., | Commissioner of Fisheries, N. J.; Natural History Editor of "Turf, | Field, and Farm," N. Y.; Proprietor of Troutdale Ponds, near Bloomsbury, N. J. | — | "We speak what we do know, and testify what we have seen." | — | New York: | Geo. E. Woodward. | — | Orange Judd & Co., | 245 Broadway. | 1872.

39128. GARLICK, THEODATUS.

A Treatise | on the | Artificial Propagation | of | certain kinds of Fish, | with the | description and habits of such kinds as are the most | suitable for pisciculture, | — | By Theodatus Garlick, M. D., | Vice President of Cleveland Academy of Natural Science. | — | Giving the author's first experiments contained in a paper read | before the Cleveland Academy of Natural Science. | Also, | directions | for the most successful modes of angling for such kinds of | fish as are herein described. | — | Cleveland: | The. Brown, Publisher, Ohio Farmer Office. | 1857.

39131. STONE, LIVINGSTON.

Domesticated Trout. | How to Breed and Grow them. | By Livingston Stone, | United States Deputy Fish Commissioner, in charge of the United States Salmon Breeding Station on the Pacific Coast; etc., etc. | "*Purpurisque Salare stellatus tergora guttis.*" | Ausonius, Idyl Tenth. | "Make assurance doubly sure." | Macbeth, Act IV: Scene 1. | Third Edition, | Revised and Enlarged. | (Cut of fish.) | Charlestown, N. H. | For sale at the Cold Spring Trout Ponds. | 1877.

39144. ATKINS, CHARLES G.

U. S. Fish Commission. | — | Cheap Fixtures | for the | Hatching of Salmon. | By | Charles G. Atkins, | Assistant U. S. Fish Commission. | — | Washington: | Government Printing Office. | 1879.

WILSON, SIR SAMUEL.

The | Californian Salmon | with an account of its | Introduction into Victoria. | By | Sir Samuel Wilson, | Member of the Legislative Council of Victoria, | — | Melbourne: | Sands & McDougall, | Printers, Collins Street, West. | 1878.

Reports of the Commissioners of Fisheries of the State of Maine, I to XIII (1867 to 1879), inclusive.

Reports of the Commissioners of the Inland Fisheries of Massachusetts, 1854 to 1879, inclusive.

LITERATURE OF FISH CULTURE.

Reports of the Fish Commissioners of the State of Connecticut, 1875 to 1880, inclusive.

Reports of the Commissioners of Fisheries of the State of New York, 1869 to 1876, inclusive.

Reports of the Commissioners of Fisheries of the State of Maryland, 1876 to 1880, inclusive.

Specifications for building the screw steamer "Fish Hawk," 1879.

IV. APPLIANCES FURNISHED BY THE SEVERAL DEPARTMENTS OF THE U. S. GOVERNMENT AND PRIVATE ORGANIZATIONS FOR THE AID AND ENCOURAGEMENT OF THE FISHERIES.

1. DEPARTMENT OF THE INTERIOR.

UNITED STATES NATIONAL MUSEUM.

- . Proceedings United States National Museum. Vol. 1, 1878, Vol. 2, 1879.
- . Bulletins United States National Museum. Nos. 1-5.
- . Model of the United States National Museum Building, now in process of erection.

PATENT OFFICE.

- . List of patents issued in the United States relating to fish and the methods, products, and applications of the fisheries. Complete to December 31, 1879.

2. DEPARTMENT OF THE TREASURY.

UNITED STATES COAST AND GEODETIC SURVEY.

Charts of the Atlantic and Pacific coasts of North America.

ATLANTIC COAST.

Cat. No.	Title.	Size of border.	Scale.	Date of last edition.
SAILING-CHARTS.				
A	Cape Sable to Cape Hatteras.....	<i>Inches.</i> 33½ by 44	1-1, 200, 000	1878
4	IV. Mosquito Inlet to Key West, with Bahama Banks.....	24 by 28	1-1, 200, 000	1875
5	V. Key West to the Rio Grande.....	28 by 52	1-1, 200, 000	1878
GENERAL CHARTS OF THE COAST.				
7	No. II. From Cape Ann to Gay Head.....	31 by 38	1-400, 000	1873
8	No. III. From Gay Head to Cape Henlopen.....	31 by 38½	1-400, 000	1877
9	No. IV. From Cape May to Cape Henry.....	31 by 38	1-400, 000	1874
10	No. V. From Cape Henry to Cape Lookout.....	32 by 39	1-400, 000	1874
23	From Pensacola to the Passes of the Mississippi.....	24 by 35	1-400, 000	1875
30	Galveston Bay.....	16½ by 19½	1-200, 000	1855
COAST CHARTS.				
105	Penobscot Bay to Kennebec Entrance, No. 5.....	29 by 37	1-80, 000	1874
106	Kennebec Entrance to Saco River, No. 6.....	29 by 38	1-80, 000	1877
107	Seguin Island to Kennebunkport, No. 7.....	30 by 38	1-80, 000	1877
108	Wells to Cape Ann, No. 8.....	30 by 39	1-80, 000	1867
109	Boston Bay and approaches, No. 9.....	30 by 39	1-80, 000	1875
110	Cape Cod Bay, No. 10.....	30 by 39	1-80, 000	1872
Coast from Monomoy and Nantucket Shoals to Block Island, in three sheets, viz:				
111	Eastern sheet: From Monomoy and Nantucket Shoals to Muskeget Channel, Mass., No. 11.....	27½ by 37½	1-80, 000	1877
112	Middle sheet: From Muskeget Channel to Buzzard's Bay and entrance to Vineyard Sound, Mass., No. 12.....	27½ by 37½	1-80, 000	1877

UNITED STATES COAST AND GEODETIC SURVEY

ATLANTIC COAST—Continued.

Cat. No.	Title.	Size of border.	Scale.	Date of last edition.
COAST CHARTS—Continued.				
		<i>Inches.</i>		
113	Western sheet: Cuttyhunk to Block Island, including Narragansett Bay	26½ by 37½	1-80,000	1876
	Long Island Sound, in three sheets, viz:			
114	Eastern sheet: From Point Judith and Block Island to Plum Island, No. 14	25½ by 35½	1-80,000	1876
115	Middle sheet: From Plum Island to Welch's Point, No. 15	25½ by 35½	1-80,000	1877
116	Western sheet: From Welch's Point to New York, No. 16	25½ by 35½	1-80,000	1877
	Southern coast of Long Island, in three sheets, viz:			
117	Eastern sheet: Block Island, Montauk Point, &c., No. 17	25 by 35	1-80,000	1857
118	Middle sheet: From Napeague Beach to Forge River, No. 18	25 by 35	1-80,000	1857
119	Western sheet: Great South Bay, Fire Island, and Long Beaches, &c., No. 19	25 by 35	1-80,000	1878
119 A	Great South Bay, and Fire Island Inlet, Long Island		1-40,000	1879
120	New York Bay and Harbor, No. 20	27 by 31	1-80,000	1877
122	Barnegat Inlet to Absecom Inlet, No. 22	29½ by 37½	1-80,000	1879
123	Absecom Inlet to Cape May, No. 23			
	Delaware Bay and River, in three sheets, viz:			
124	Lower sheet: Delaware Entrance, No. 24	25½ by 36	1-80,000	1877
125	Middle sheet: Part of Delaware Bay and River, No. 25	25½ by 36	1-80,000	1877
126	Upper sheet: Delaware River, Port Penn to Trenton, No. 26	25½ by 36	1-80,000	1877
127	From Cape May to Isle of Wight, No. 27	29 by 33	1-80,000	1869
128	From Isle of Wight to Chincoteague Inlet, No. 28	29 by 33	1-80,000	1874
130	From Hog Island to Cape Henry	29 by 33	1-80,000	1875
	Chesapeake Bay, in two series, three sheets each:			
	First series, in three sheets, entrance of Bay to Potomac River, viz:			
131	1. Entrance to Chesapeake, Hampton Roads, &c., No. 31	26 by 38	1-80,000	1877
132	2. From York River to Pocomoke Sound, No. 32	26 by 38	1-80,000	1877
133	3. From Pocomoke Sound to Potomac River, No. 33	26 by 38	1-80,000	1877
	Second series, in three sheets, Potomac River to head of Bay, viz:			
134	1. From Potomac River to Choptank River, No. 34	30 by 37½	1-80,000	1877
135	2. From Choptank River to Magohy River, No. 35	30 by 37½	1-80,000	1877
136	3. From Magohy River to head of Bay, No. 36	30 by 37½	1-80,000	1877
138	Currituck Beach Light to Oregon Inlet	27 by 35½	1-80,000	1879
129	Oregon Inlet to Cape Hatteras			
	Albemarle Sound, in two sheets, viz:			
140	Eastern sheet, from the Atlantic Ocean to the Pasquotank River, No. 40	29½ by 31½	1-80,000	1876
141	Western sheet, from the Pasquotank River to the Roanoke and Chowan Rivers, No. 41	29½ by 31½	1-80,000	1877
154	From Long Island to Hunting Island, No. 54	33 by 41	1-80,000	1875
155	From Hunting Island to Ossabaw Island, No. 55	33 by 41	1-80,000	1875
156	From Savannah to Sapelo Island, No. 56	32 by 41	1-80,000	1876
157	From Sapelo Island to Amelia Island, No. 57	32 by 41	1-80,000	1876
	Florida Reefs, from Key Biscayne to Boca Grande Key, in four sheets:			
166	From Key Biscayne to Carysfort Reef, No. 66	32 by 39	1-80,000	1878
167	From the Elbow to Matecumbe Key, No. 67	32 by 39	1-80,000	1874
168	From Long Key to Newfound Harbor Key, No. 68	32 by 39	1-80,000	1874
169	From Newfound Harbor Key to Boca Grande Key, No. 69	32 by 39	1-80,000	1874
177	Tampa Bay	33 by 39	1-80,000	1879
186	Choctawhatchee Inlet to Pensacola Entrance, No. 86	30 by 40	1-80,000	1875
188	Mobile Bay, No. 88	29 by 38	1-80,000	1856
	Mississippi Sound, &c., rear approach to New Orleans, in three sheets, viz:			
189	From Bon Secours Bay to Round Island, No. 89	31½ by 40½	1-80,000	1860
190	From Round Island to Grand Island, No. 90	32 by 41½	1-80,000	1860
191	Lake Borgne and Pontchartrain, No. 91			
194	Mississippi River, from the Passes to Grand Prairie, No. 94	33 by 41	1-80,000	187-
205	From Galveston Bay to Oyster Bay, No. 105	32½ by 40	1-80,000	1874
206	From Oyster Bay to Matagorda Bay, No. 106	32 by 40	1-80,000	1858
HARBOR CHARTS.				
302 A	Eastport Harbor	17 by 20	1-40,000	1874
290	Somes Sound, Mount Desert Island	29½ by 48½	1-10,000	1871
309 A	Head Harbor and approaches, Isle au Haut	13½ by 18	1-12,500	1878
310	Penobscot Bay	24½ by 29½	1-40,000	1876
312	St. George's River and Muscle Ridge Channel	24 by 38	1-40,000	1864
313	Damariscotta and Medomak Rivers	25½ by 38	1-40,000	1874
314	Kennebec and Sheepscot Rivers	23½ by 38½	1-40,000	1874

UNITED STATES COAST AND GEODETIC SURVEY.

ATLANTIC COAST—Continued.

Cat. No.	Title.	Size of border.	Scale.	Date of last edition.
HARBOR CHARTS.				
		<i>Inches.</i>		
315	Casco Bay	26 by 40	1-40, 000	1871
318	Bar Harbor	13 by 15	1-10, 000	1876
319	Belfast Harbor	11 by 13½	1-20, 000	1875
325	Portland Harbor	26 by 29	1-20, 000	1862
329	Portsmouth Harbor	18½ by 26	1-20, 000	1876
330	Isle of Shoals	14 by 17	1-20, 000	1874
315	Salem Harbor	21 by 28	1-25, 000	1875
337	Boston Harbor	28½ by 36	1-40, 000	1875
338	Plymouth, Kingston, and Duxbury Harbors	19 by 20	1-40, 000	1875
339	Barnstable Harbor	16½ by 23	1-20, 000	1861
340	Wellfleet Harbor	14 by 17½	1-50, 000	1853
341	Provincetown Harbor	14½ by 17½	1-50, 000	1878
244	Monomoy Passage to Nantucket Sound	17½ by 24	1-40, 000	1876
345	Muskeget Channel	21 by 28	1-60, 000	1872
347	Vineyard Haven	12 by 18	1-15, 000	1873
348	Wood's Holl Harbor	13 by 17½	1-20, 000	1872
350	New Bedford Harbor	17 by 17½	1-40, 000	1876
353	Narragansett Bay (in two sheets)	31 by 48	1-40, 000	1873
356	Duck Island Harbor, Long Island Sound	10½ by 15	1-15, 000	1879
359	New London Harbor	14 by 17½	1-20, 000	1872
362	New Haven Harbor	18 by 21½	1-20, 000	1875
368	Huntington Bay	14 by 17½	1-30, 000	1872
119 A	Great South Bay and Fire Island Inlet	25 by 41½	1-40, 000	1879
	Lake Champlain, in four sheets, viz:			
553	No. 1, from Rouse's Point to Cumberland Head	26½ by 36½	1-40, 000	1879
554	No. 2, from Cumberland Head to Ligonier Point	26½ by 36½	1-40, 000	1879
555	No. 3, from Ligonier Point to Panton	21 by 29½	1-50, 000	1876
556	No. 4, from Panton to Whitehall	21 by 29½	1-25, 000	1876
540	Rockaway Inlet	14½ by 24½	1-18, 000	1878
540 A	Jamaica Bay and Rockaway Inlet	21½ by 26½	1-25, 000	1879
369	New York Bay and Harbor, in two sheets	39 by 48	1-43, 000	1874
369 ^a	New York Entrance	80½ by 39	1-40, 000	1875
	Hudson River, in three sheets:			
370	No. 1. New York to Haverstraw	17½ by 40	1-60, 000	1879
371	No. 2. Haverstraw to Poughkeepsie	17½ by 40	1-60, 000	1879
372	No. 3. Poughkeepsie to Troy, in two sheets	34 by 40	1-40, 000	1879
565	Passaic River	20½ by 26	1-7, 500	1875
374	Absecon Inlet	14½ by 17½	1-20, 000	1864
376	Delaware and Chesapeake Bays	25½ by 31	1-40, 000	1874
384	Patuxent River	17½ by 27½	1-60, 000	1877
385	Annapolis Harbor	14 by 17	1-60, 000	1874
388	1. Entrance and up to Piney Point	23 by 29½	1-60, 000	1871
389	2. Piney Point to Lower Cedar Point	23 by 29½	1-60, 000	1871
390	3. Lower Cedar Point to Indian Head	23 by 29½	1-60, 000	1871
391	4. Indian Head to Georgetown	23 by 39	1-40, 000	1875
	York River, Virginia, in two sheets, viz:			
398	1. From entrance to King's Creek	17 by 23	1-60, 000	1858
399	2. From King's Creek to West Point	17 by 23	1-60, 000	1871
	James River, from entrance to City Point, in three sheets, viz:			
401 A	1. From Newport News to Deep Water Light	17½ by 27½	1-50, 000	1877
401 B	2. From Point of Shoals Light to Sloop Point	17½ by 27½	1-50, 000	1877
401 C	3. From Sloop Point to City Point	17½ by 26½	1-50, 000	1877
404	Norfolk Harbor, Elizabeth River and Branches	22 by 28	1-25, 000	1875
420	Beaufort Harbor	22½ by 24	1-40, 000	1876
423	Lookout Cove	18½ by 21½	1-6, 000	1879
427	Georgetown Harbor	16½ by 19	1-6, 000	1879
428	Winyah Bay, S. C.	18½ by 28½	1-40, 000	1877
431	Charleston Harbor	31½ by 32	1-30, 000	1872
436	Saint Helena Sound	24 by 28	1-40, 000	1878
440	Savannah River and Warsaw Sound	20 by 33	1-40, 000	1878
441	Ossabaw Sound	24 by 37	1-30, 000	1873
443	Saint Catherine's Sound	20 by 28	1-40, 000	1872
444	Sapelo Sound	23 by 34	1-30, 000	1872
446	Doboy and Altamaha Sounds	21½ by 38½	1-40, 000	1875
448	Saint Andrew's Sound	23 by 29	1-40, 000	1875
453	Saint Mary's River and Fernandina Harbor	25 by 32	1-20, 000	1879
455 ^a	3. From Jacksonville to Lake Monroe	24½ by 36½	1-80, 000	1878
	Inside Passage, East Coast of Florida, in eight sheets, viz:			
	No. 1. Head of Halifax River	21½ by 32½	1-20, 000	1876
	No. 2. Halifax River, vicinity of Daytona	21½ by 32	1-20, 000	1876
	No. 3. Mosquito Inlet and vicinity of New Smyrna	21½ by 31½	1-20, 000	1876

UNITED STATES COAST AND GEODETIC SURVEY.

ATLANTIC COAST—Continued.

Cat. No.	Title.	Size of border.	Scale.	Date of last edition.
HARBOR CHARTS—Continued.				
		<i>Inches.</i>		
460	No. 4. Hillsborough River.....	22 by 32	1-20,000	1876
461	No. 5. Mosquito Lagoon, northern part.....	21½ by 32	1-20,000	1877
462	No. 6. Mosquito Lagoon, south part.....	21½ by 32	1-20,000	1877
463	No. 7. Head of Indian River to Titusville.....	21½ by 32	1-25,000	1877
464	No. 8. Indian River, from Titusville, southward.....	21½ by 32½	1-25,000	1877
469	Key West Harbor.....	24 by 34	1-50,000	1879
471	Tortugas Harbor and Approaches.....	25 by 28	1-80,000	1874
477	Entrance to Tampa Bay.....	26 by 37½	1-40,000	1877
490	Entrance to Pensacola Bay.....	25½ by 31½	1-30,000	1877
510	Mississippi River, from Fort Jackson to New Orleans (in 7 sheets), 1, 2, 3, 4, 5, 6, 7.....	23 by 33	1-20,000	1878
510	Mississippi River, from New Orleans to Point Houmas, below Donaldsonville (in 6 sheets), 8, 9, 10, 11, 12, 13.....	23 by 33	1-20,000	1878
511	Entrance to Barataria Bay.....	17 by 19	1-20,000	1878
512	Lower Barataria Bay and Entrance.....	18 by 19	1-40,000	1879
520	Galveston Entrance.....	14 by 17	1-40,000	1874
526	Aransas Pass.....	14½ by 17½	1-15,000	1876
528	Rio Grande Entrance.....	14 by 16	1-20,000	1854

PACIFIC COAST.

SAILING-CHARTS.				
Lower California (in two sheets), viz:				
600	1. From Cape San Lucas to Cerros Island.....	23 by 25	1-1,200,000	1874
	2. From Cerros Island to San Diego.....	22 by 25	1-1,200,000	1874
California, Oregon, and Washington Territory reconnaissance, in three sheets, viz:				
601	1. From San Diego to San Francisco.....	22 by 23	1-1,200,000	1875
602	2. From San Francisco to Umpquah River.....	22½ by 25	1-1,200,000	1875
603	3. From Umpquah River to northwest boundary.....	22½ by 25	1-1,200,000	1875
Northwest coast of America, in three sheets, viz:				
	1. Not checked.....			
701	2. From Dixon entrance to Cape Saint Elias.....	25 by 23	1-1,200,000	1870
702	3. From Icy Bay to Seven Islands.....	25 by 23	1-1,200,000	1870
GENERAL CHARTS OF THE COAST.				
675	From Point Pinos to Bodega Head.....	28 by 39	1-200,000	1874
HARBOR CHARTS.				
606	San Diego Bay.....	20 by 27	1-40,000	1872
613	Catalina Harbor and Isthmus Cove.....	19½ by 24½	1-15,000	1875
608	Santa Monica.....	17 by 18½	1-20,000	1876
609	San Luis Obispo Bay and approach.....	16½ by 25½	1-20,000	1879
618	Montrey Bay.....	20½ by 31	1-60,000	1878
621	San Francisco Bay entrance.....	24 by 39	1-50,000	1875
622	San Francisco Bay, upper part.....	27 by 36	1-50,000	1862
625	Mare Island Strait.....	20½ by 40	1-10,000	1876
626	Suisun Bay.....	20 by 35	1-40,000	1866
629	Drake's Bay.....	19½ by 30	1-40,000	1880
631	Tomales Bay.....	15½ by 24½	1-30,000	1861
630	Bodega Bay.....	13 by 17	1-30,000	1862
665	Mendocino Bay.....	19 by 25	1-20,000	1874
632	Humboldt Bay.....	14 by 17½	1-30,000	1870
633	Trinidad Harbor.....	14 by 17½	1-15,000	1874
635	St. George's Reef and Crescent City.....	21 by 26	1-40,000	1875
634	Cape Orford and Reef.....	21 by 26	1-40,000	1874
664	Yaquina River entrance.....	19 by 25	1-20,000	1874
639	Approaches to the Columbia River.....	19½ by 43½	1-100,000	1878
641 A	Columbia River, sheet No. 3.....	24 by 29	1-40,000	1878
643	Gray's Harbor.....	16½ by 17	1-40,000	1862
651	Seattle Harbor, Puget Sound.....	18 by 21	1-20,000	1877
645	Budd's Inlet.....	20½ by 36	1-20,000	1876
662	Puget Sound.....	17 by 27	1-200,000	1870
690	Commencement Bay, Puget Sound.....	20 by 20	1-20,000	1877

UNITED STATES COAST AND GEODETIC SURVEY.

Coast Pilot of the Eastern Coast of the United States.

1879. United States | Coast and Geodetic Survey | Carlile P Patterson | Superintendent | — | Atlantic Coast Pilot | Eastport to Boston | (Seal of the Coast Survey) | Washington | Government Printing Office | 1879

1878. United States Coast Survey | Carlile P Patterson | Superintendent | — | Atlantic Coast Pilot | Boston Bay to New York | (Seal of the Coast Survey) | Washington | Government Printing Office | 1878

Coast Pilot of Alaska.

1879. United States | Coast and Geodetic Survey | Carlile P Patterson | Superintendent | — | Pacific Coast Pilot | Coasts and Islands | of | Alaska | (Seal of the U. S. Coast and Geodetic Survey) | Second Series | Washington | Government Printing Office | 1879 | 4to, pp. 376 and 19 plates

— Heliotype drawings of apparatus for deep-sea research used by the United States Coast Survey steamer Blake, Commander Sigsbee.

Plate 1. The United States Coast Survey steamer G. S. Blake, 350 tons, fitted for deep sea soundings and dredgings.

Plate 2. Fig. 1. Miller-Casella thermometer case fitted with Sigsbee's spring clamp. Fig. 2. Sounding rod.

Plate 3. Fig. 1. Miller-Casella thermometer-case fitted with Sigsbee's spring clamp. Fig. 2. Sounding rod.

Plate 4. Showing some of the causes, probable and real, of the occasional failure of sinkers to detach.

Plate 5. Fig. 1. Cans for observing currents. Figs. 2. Sounding lead fitted with the Stellwagen specimen cup.

Plate 6. Showing the general form and working of Sir Wm. Thomson's sounding-machine as used on board the Blake, &c.

Plate 7. Experimental form of the Sigsbee machine for sounding with wire. Used for three years on board the Blake.

Plate 8. The latest form of the Sigsbee machine, as now used on board the Blake.

Plate 9. The Sigsbee sounding-machine rigged for paying out.

Plate 10. The Sigsbee sounding-machine rigged for paying out.

Plate 11. The Sigsbee sounding-machine rigged for reeling in, with the strain-pulley brought into use.

Plate 12. The Sigsbee sounding-machine folded for transportation.

Plate 13. The Sigsbee sounding-machine in position, run out for work.

Plate 14. The Sigsbee sounding-machine in position, run in with the tubes lowered and the accommodation grating triced up.

Plate 15. The Sigsbee sounding-machine in position, run out for work.

Plate 16. New steel reel for sounding with wire, devised by Lieut. Commander C. D. Sigsbee, U. S. N., Assist. Coast Survey.

Plate 17. New steel reel for sounding with wire.

Plate 18. Plan of patent trunk reeling engine for the Sigsbee sounding-machine.

Plate 19. Water specimen cup for getting a single specimen at each haul, independent poppet valves.

Plate 20. The Sigsbee water specimen cup.

Plate 21. Fig. 1. Case for the Negretti-Zambra deep sea thermometer. Fig. 2. The Negretti-Zambra deep sea thermometer, bulb down. Fig. 3. The Miller-Casella deep sea thermometer, apart from its case.

UNITED STATES COAST AND GEODETIC SURVEY.

Apparatus for deep-sea research, &c.—Continued.

Plate 22. Fig. 1. Case for the Negretti-Zambra deep sea thermometer.
Fig. 2. The Negretti-Zambra deep sea thermometer, bulb up.
Fig. 3. The Miller-Casella deep sea thermometer, with the bulbs exposed.

Plate 23. Fig. 1. The Negretti-Zambra deep sea thermometer in use.
Fig. 2. The Negretti-Zambra deep sea thermometer in use.

Plate 24. The Blake at the Washington navy-yard. The dredging-gear ready for work.

Plate 25. Fig. 1. Style of dredge supplied for the first dredging expedition of the Blake. Figs. 2, 3, and 4 dredge, devised by Lieut. Commander C. D. Sigsbee, United States Navy, and Master H. M. Jacoby, United States Navy, and adopted for use.

Plate 26. Fig. 1. Plan of the trawl as first used on board the Blake.
Fig. 2. Plan of trawl as improved by Professor Agassiz, Lieutenant-Commander Sigsbee, and Lieutenant Ackley.

Plate 27. The improved trawl ready for use.

Plate 28. The improved trawl shown as having "tripped" after fouling with rough bottom.

Plate 29. Plans of the deck and apparatus of the Blake. Fig. 1 and 2. During the first dredging expedition. Fig. 3. During the second expedition.

Plate 30. View of the Blake's deck looking forward from the bow of the starboard quarter boat, ready for paying out the dredge.

Plate 31. View of the Blake's deck looking aft from the starboard side of the pilot-house, ready for dredging.

Plate 32. The forward side of the dredge reel and its engine, the reel having on it 2,700 fathoms of the steel rope recommended by Prof. Alexander Agassiz.

Plate 33. View of the main hoisting engine from the starboard side.

Plate 34. Figs. 1 and 2. Iron snatch-block for dredging rope. Fig. 3. Improved accumulator for dredging.

Plate 35. The plotting of a line of soundings.

Plate 36. Improved machine for sounding with wire.

Plate 37. Continuation of Plate 36.

Plate 38. Continuation of Plates 36 and 37.

Plate 39. Sigsbee's detacher.

Plate 40. Water specimen cup.

Plate 41. Curve for correcting the reading of the register placed on the axle of the sounding reel, by Lieut. Commander C. D. Sigsbee, U. S. N., Assist. Coast Survey.

LIFE-SAVING SERVICE.

Collective exhibit.

39256. Specifications for building vessels. U. S. R. M. 2 copies.

39320. Annual Report Life-Saving Service for the fiscal year ending June 30, 1878. 2 copies.

39333. Report of the Life-Saving Ordnance. Lieut. D. A. Lyle.

39321. Revised Regulation Life-Saving Service.

39318. Report Life-Saving Service, 1876.

39319. Annual Report Life-Saving Service, 1877.

39294. Manual.

LIFE-SAVING SERVICE.

Collective exhibit—Continued.

39332. Design for houses of refuge. Coast of Florida.
39330. Specifications and drawings for a life-saving station on the coast of Texas.
39331. Specifications and drawings life-boat station at Ludington, Mich.
39329. Specifications for a surf-boat wagon. 4 copies.
39328. " " surf-boat. 2 copies.
39327. " " hand-cart of U. S. Life-Saving Service. 3 copies.
39323. Coast signal service. Official danger or distress signals. 1878. 3 copies.
39322. Mortar and beach apparatus. Drill. 5 copies.
39324. Exterior life-saving station. Photograph.
39326. Beach carriage with apparatus, loaded. 2 photographs.
39325. Interior life-saving station. Photograph.
- 39318, 39319, 39320. Annual Reports, 1876-77-'78.
39321. Revised regulations.
39322. Mortar and beach apparatus drill.
39323. Danger or distress signals.
- 39324, 39325. Views, exterior and interior, life-saving station.
39326. Beach carriage and apparatus, loaded.
39327. Specifications, hand-cart.
39328. " surf-boat.
39329. " " wagon.
39330. " and plans life-saving station.
39331. " " life-boat station.
39332. Plans for houses of refuge.
- . Lyle mortar gun, for throwing a line across a vessel in distress.
- . Coston signals, used in Life-Saving Service.
- . Copies of the gold and silver medals given by the U. S. Treasury Department for saving life.

LIGHT-HOUSE BOARD.

39257. Collective exhibit of charts.
- Chart of the First Light-house District, comprising the coasts of Maine and New Hampshire.
- Chart of the Second Light-house District, comprising the coast of Massachusetts.
- Chart of the Third Light-house District, comprising the coasts of Rhode Island, Connecticut, New York, and part of New Jersey.
- Chart of the Fourth Light-house District, extending from Squan Inlet, New Jersey, to Matomkin Inlet, Virginia.
- Chart of the Fifth Light-house District, extending from Matomkin Inlet, Virginia, to New River Inlet, North Carolina.
- Chart of the Sixth Light-house District, extending from New River Inlet, North Carolina, to Cape Canaveral, Florida.
- Chart of the Seventh Light-house District, comprising the coasts of Florida, from (but not including) Cape Canaveral, to the Perdido River.
- Chart of the Eighth Light-house District, extending from the Perdido River, Florida, to the Rio Grande, Texas.
- Chart of the Eleventh Light-house District, comprising the Lakes Saint Clair, Huron, Michigan, Superior, and Saint Mary's River.

LIGHT-HOUSE BOARD.

39257. Collective exhibit of charts—Continued.

Chart of the Twelfth Light-house District, embracing the coast of California.

Chart of the Thirteenth Light-house District, embracing the coasts of Oregon and Washington.

REVENUE MARINE DIVISION.

— . Plans of revenue cutters employed in part in assisting distressed fishermen.

OFFICE OF THE SECRETARY.

— . Series of blanks used in licensing and registering fishing vessels, bonding salt, making report of fishing catch, etc.

3. DEPARTMENT OF WAR.

UNITED STATES ARMY SIGNAL-SERVICE.

39287. Weather symbol-map.

To be exhibited at fishing villages, showing the weather conditions on the coasts and at different points throughout the country.

39288. Instrumental farmer's and fisherman's weather-case.

By the aid of which, predictions fairly accurate, can be made by any one using the case according to the rules printed upon the face thereof. See circulars describing weather case, and rain and dry winds pamphlets and charts.

39289. Circulars describing the weather-case, and method of using the same.

39290. "Dry and wet wind" pamphlets.

39291. Sets of "dry and wet wind" charts.

39292. Water thermometer and case.

Used in taking the temperature of water, at surface and bottom, in the various rivers and harbors situated near the United States Signal-Service stations.

39293. Signal kit, complete.

Used in holding communication on land or sea, by day or night. For description of contents and mode of using same, see Myer's "Manual of Signals."

39294. "Manual of Signals," by Brig. Gen. A. J. Myer.

39295. Complete set of international signal-flags.

For holding communication between vessels, or between vessels and stations on land, using the international code of signals. See, also, circular on "Danger or distress signals."

39293. Complete set of cautionary signal-flags (for display by day).

39297. Complete set of cautionary signal-lanterns (for display by night).

Displayed, in advance of storms, at 48 regular Signal-Service stations and 50 "display" stations, along the Gulf and Atlantic coasts, and along the shores of the great lakes. For description and mode of using, see "Cautionary signal" pamphlets.

39298. "Cautionary signal" pamphlets.

39299. "Danger or distress-signals," circulars.

39300. Volume of the "Monthly Weather Review."

In this work the following items may be mentioned as of special interest to the fishing community: 1. The description of storms over the North American continent and North Atlantic Ocean. 2. Inter-

UNITED STATES ARMY SIGNAL-SERVICE.

39300. Volume of the "Monthly Weather Review"—Continued.

national weather maps showing, by months, the mean temperature, pressure, and the prevailing winds, at 7.35 a. m., Washington mean time, over the northern hemisphere, and also the approximate position of the centers of storm-areas at that hour. 3. Notes on the formation and disappearance of ice, and closing and opening of navigation on all the large rivers and lakes, and along the seaboard of the United States; and, 4. The temperature of water, surface and bottom, in the rivers and harbors of the United States.

39301. Volumes of the "International Bulletin," with daily charts.

39302. Volumes tri-daily weather maps of the United States.

39303. Volumes of "Synopses, facts, and indications."

39304. "Annual report" of the Chief Signal-Officer.

ENGINEER BUREAU.

Charts of the inland waters of the United States.

1. Lake Erie.
2. West End, Lake Erie.
3. Kelly's and Bass Island, Lake Erie.
- 3^a. Head of Green Bay, Lake Michigan.
4. Straits of Mackinaw.
5. East Neebish Rapids, St. Mary's River.
6. Saginaw River.
7. St. Clair Flats.
8. Buffalo Harbor.
9. Tawas Harbor, Lake Huron.
10. Beaver Island Group, Lake Michigan.
11. Eagle Harbor, Lake Superior.
12. Agate Harbor, " "
13. River St. Marie, No. 1.
14. " " 2.
15. Maumee Bay, Lake Erie.
16. Eagle River, Lake Superior.
17. Ontonagon Harbor, Lake Superior.
18. Saginaw Bay, Lake Huron.
19. Thunder Bay, " "
20. Marquette Harbor, Lake Superior.
21. Presque Isle and Middle Island, Lake Huron.
22. Lake Huron.
23. South End, Lake Huron,
24. Grand Island, Lake Superior.
25. West End, Lake Superior.
26. Grand and Little Traverse Bays, Lake Michigan.
27. North End of Green Bay.
28. Copper Harbor, Lake Superior.
29. L'Anse and Keweenaw Bay, Lake Superior.
30. Portage Lake and River, Lake Superior.
31. Lake Superior, No. 1.
32. " " " 2.
33. North End, Lake Michigan.
34. Huron Islands, Lake Superior.

ENGINEER BUREAU.

Charts of the inland waters of the United States—Continued.

35. South End, Green Bay.
36. Lake Superior, No. 3.
37. St. Clair River.
38. Isle Royale, Lake Superior.
- 39.
40. City of Chicago.
41. Lake St. Clair.
42. St. Lawrence River, No. 1.
43. Sandusky Bay.
44. St. Lawrence River, No. 2.
45. " " " 3.
46. " " " 4.
47. Sand Beach Harbor of Refuge, Lake Huron.
- 48.
49. St. Lawrence River, No. 5.
50. South End, Lake Michigan.
51. Coast Chart, No. 5, Lake Michigan.
52. Coast Chart, No. 3, Lake Michigan.
53. St. Lawrence River, No. 6.
54. Coast Chart, No. 2, Lake Michigan.
55. Coast Chart, No. 1, "
56. Detroit River.
57. Coast Chart, No. 6, Lake Michigan.
58. " " 7, "
59. " " 4, "
60. " " 1, Lake Ontario.
61. Lake Ontario.
62. Coast Chart, No. 9, Lake Michigan.
63. " " 8, "
64. " " 2, Lake Ontario.
65. " " 3, "
66. " " 4, "
67. " " 5, "
68. " " 2, Lake Erie.
69. " " 3, "
70. " " 4, "
- 71.
72. Coast Chart, No. 6, Lake Erie.
- 73.
- 74.
- 75.
76. Mississippi River Charts, vicinity of Cairo, No. 1.
77. " " " 2.
78. " " " 3.
79. " Between lat. 34° 53' and lat. 35° 13', No. 4.
80. " " " 5.
81. " " " 6.
82. " " " 7.
83. " " " 8.
84. " " " 9.
85. " " " 10.
86. " " " 11.
87. " " " 12.
88. " " " 13.

4. DEPARTMENT OF THE NAVY.

BUREAU OF NAVIGATION—HYDROGRAPHIC OFFICE.

- Charts of the Atlantic and Pacific coasts of North America.
 - 21. North Atlantic Ocean. Sheet I.
 - 16-18. Northeast coast of North America. Sheets I, II, III.
 - 238-9. East coast of North America. Sheets IV, V.
 - 9, 15. Gulf of St. Lawrence, Newfoundland, and Banks adjacent. Sheets I, II.
 - 240-241. North Coast of Gulf of Mexico. Sheets I, II.
 - 19, 20. Bahama Banks and Gulf of Florida. Sheets I, II.
 - 31-36. Gulf of Mexico, West Indies, and Caribbean Sea. Sheets I, II, III, IV, V, VI.
 - 40. Windward Islands and Caribbean Sea.
 - 704. Gulf Coast of Mexico. Sheet I.
 - 527. North Pacific Ocean. Sheet II.

NAUTICAL ALMANAC OFFICE.

- American Nautical Almanacs, 1877. 4 copies.

“	“	“	1878.	“
“	“	“	1879.	“
“	“	“	1880.	“
“	“	“	1881.	“
“	“	“	1882.	“
- American Ephemeris, 1880. 4 copies.

“	“	1881.	“
“	“	1882.	“

5. STATE OR PRIVATE ORGANIZATIONS.

MASSACHUSETTS HUMANE SOCIETY.

- Reports of the Massachusetts Humane Society.
- Medals for Life-Saving Service granted by the Massachusetts Humane Society.

APPENDIX.*

SECTION C.

MEANS OF PURSUIT AND CAPTURE. (p. 53.)

I. HAND IMPLEMENTS OR TOOLS.

3. AXES.

BOAT-AXES. (p. 55.)

39472. Two boat-axes, with (A. S. Crosby & Co.'s, Waterville, Me.) patent cover. Bradford & Anthony, Boston, Mass.

II. IMPLEMENTS FOR SEIZURE OF OBJECT. (p. 56.)

7. BARBED IMPLEMENTS (THOSE USED WITH TWO MOTIONS, THE FIRST THAT OF THRUSTING.)

SPEARS WITH FIXED HEADS. (p. 59.)

39457. Improved eel-spear. (Manufactured by the New London Fish-Spear Company, New London, Conn.) Bradford & Anthony, Boston, Mass.

IV. BAITED HOOKS, ANGLING-TACKLE. (p. 64.)

16. (ACCESSORY.) PARTS AND ACCESSORIES OF ANGLING-APPARATUS, AND OF HARPOON AND SEINE LINES.

LINES (TWISTED AND PLAITED). (p. 85.)

Silk lines.

42931. Standard braid silk line. 50 yards.	William Mills & Son, New York.
42928. Water-proof line. 40 yards "E."	" "
42929. Water-proof line. 30 yards "F."	" "
42930. Water-proof line. 25 yards "F."	" "

TROUT AND GRAYLING FLIES.

42933. Fly-book with 1½ dozen flies.	William Mills & Son, New York.
42932. Fly-book.	" "

LINE HOLDERS AND THROWERS.

39427. Machine for throwing fishing-line. Manufactured by L. A. Peck, Boston, Mass. Bradford & Anthony, Boston, Mass.

* Enumerating articles received too late to be given in the body of the Catalogue.

RODS. (p. 92.)

42925. Salmon-rod. Extra tip. H. L. Leonard, Bangor, Me., through William Mills & Son, New York.
42926. Trout-rod. Extra tip and case. H. L. Leonard, Bangor, Me., through William Mills & Son, New York.
42927. Combination rod. Seven pieces, making eight distinct changes in caliber. H. L. Leonard, Bangor, Me., through William Mills & Son, New York.

SECTION E.

ANIMAL PRODUCTS AND THEIR APPLICATION. (p. 143.)

I. FOODS.

2. FOODS PREPARED FOR KEEPING. (p. 143.)

DRIED PREPARATIONS, WITH AND WITHOUT SALT.

42939. Alden's evaporated fresh codfish. Sample represents ten pounds of whole fresh codfish. Charles Alden, Gloucester, Mass.
42946. Okhotsk codfish. Lynde & Hough, San Francisco, Cal.
42947. Boneless Okhotsk codfish. Lynde & Hough, San Francisco, Cal.
42958. Alaska codfish, Choumagin Islands, Alaska. Thomas McCollam & Co., San Francisco, Cal.
39407. "Lion and Unicorn Boneless Cod." Potter & Wrightington, Boston.
42957. Codfish tongues and sounds. Lynde & Hough, San Francisco, Cal.
42952. Salted salmon. Lynde & Hough, San Francisco, Cal.
42959. Salted herring. Thomas McCollam & Co., "
42960. Dried barracuda from San Diego, Cal. John Smith, San Francisco, Cal.
42965. A bag of dried fish. The common sort put up by most Chinese colonies. Includes *Caulolatilus* and *Pimelometopon* from San Diego. Quan Wing Yick, San Francisco, Cal.
42966. Lot of dried fish from China (put up in matting). It includes some cephalopods of different sorts, besides *Cynoglossus*, *Amblyscion*, *Stromateus*, *Tetrodon*, and some other Labroids, Carangoids, and Flounders. Quan Wing Yick, San Francisco, Cal.
42940. Dried soft-shell clams. Put up by Charles Alden, Gloucester, Mass.
42941. Soft shell clams. Dried and ground with all the juices retained. A fine clam soup may be made by the addition of water and cooking for twenty minutes. Charles Alden, Gloucester, Mass.
42969. Shrimp meats, after being dried, pulverized, and put through fanning-mill. Bay View Chinese Colony, California.
42967. Shrimps. From the Chinese colonies on the bay, in three sorts—plain, peeled, and strung on matting. Quan Wing Yick, San Francisco, Cal.

SMOKED PREPARATIONS. (p. 143.)

42951. Smoked salmon. Lynde & Hough, San Francisco, Cal.
 42950. Smoked herring. Lynde & Hough, San Francisco, Cal.
 42963. Smoked herring. San Francisco Bay, California. Leo Waltman, San Francisco, Cal.
 42964. Smoked sturgeon. San Francisco Bay, Cal. Leo Waltman, San Francisco, Cal.
 42953. Smoked candle fish (*Thaleichthys pacificus*). Lynde & Hough, San Francisco, Cal.

PICKLE OR BRINE-SALTED PREPARATIONS. (p. 144.)

42962. Pickled herring. San Francisco Bay, California. Leo Waltman, San Francisco, Cal.
 42955. Salmon tips (throats, etc.). Lynde & Hough, San Francisco, Cal.
 42956. Salmon bellies. Lynde & Hough, San Francisco, Cal.
 42954. Halibut fins. Lynde & Hough, San Francisco, Cal.
 42907. Russian caviar. H. K. & F. B. Thurber & Co., New York.
 42971. Caviar. Pacific Coast Packing Company, San Francisco, Cal.
 42991. Caviar of 1880. Schacht and Fruechtnecht, Sandusky, Ohio.

PREPARATIONS IN SPICES AND VINEGAR, &c. (p. 144.)

42961. Preserved Norsk anchovies. San Francisco Bay, California. Leo Waltman, San Francisco, Cal.
 42911. Shrimps. (Dunbar & Co.) H. K. & F. B. Thurber & Co., New York.
 42912. Spiced shrimps. (J. W. Jones.) H. K. & F. B. Thurber & Co., New York.
 42914. Cowdry, pickled lobsters in jars. H. K. & F. B. Thurber & Co., New York.
 42915. Pecor. Fresh shrimps. H. K. & F. B. Thurber & Co., New York.
 42916. Pickled oysters. (McMenamin, Hampton, Va.) H. K. & F. B. Thurber & Co., New York.
 42905. Thurber's pickled shrimps. H. K. & F. B. Thurber & Co., New York.

PREPARATIONS IN OIL. (p. 144.)

42910. Shadines. (Home & Odell.) H. K. & F. B. Thurber & Co., New York.
 42979. California sardines. (*Clupea sagax*.) Pacific Coast Packing Company, San Francisco, Cal.
 42982. Russian sardines, mariné. (*Clupea sagax*.) Pacific Coast Packing Company, San Francisco, Cal.

COOKED PREPARATIONS IN CANS. (p. 144.)

42985. Canned Oregon salmon. Can shape of a fish. Containing an entire fish. Oval brand. A. Booth & Co., Baltimore, Chicago, and San Francisco.
 42986. Canned Oregon salmon. Square can, containing about twenty-eight pounds fish. Oval brand. A. Booth & Co.
 42987. Canned Oregon salmon. One and two pounds. Oval brand. A. Booth & Co.

COOKED PREPARATIONS IN CANS.

42949. Salmon. Put up by Oregon Packing Company, Astoria, Oreg. Lynde & Hough, San Francisco, Cal.
42913. Salmon. H. K. & F. B. Thurber & Co., New York.
42977. Salmon ravigotte. Pacific Coast Packing Company, San Francisco, Cal.
42948. Cape Flattery canned halibut. Lynde & Hough, San Francisco, Cal.
42900. Canned clams. (J. W. Ketchum & Co.) H. K. & F. B. Thurber & Co., New York.
42902. Underwood's clam chowder. H. K. & F. B. Thurber & Co., New York.
42903. Underwood's clams. H. K. & F. B. Thurber & Co., New York.
42983. Cove oysters, 1-pound cans. Union Oyster Co., Baltimore, Md.
42984. Cove oysters, 2-pound cans. Union Oyster Co., Baltimore, Md.
42989. Cove oysters, 1 and 2-pound cans. A. Booth.
42904. Crabs (deviled). "My Maryland." H. K. & F. B. Thurber & Co.
42908. "My Maryland Crabs." H. K. & F. B. Thurber & Co., New York.
42909. Bryce crab meat. H. K. & F. B. Thurber & Co., New York.
42972. Bloaters (Bücklinge) (herrings). Pacific Coast Packing Company, San Francisco, Cal.
42973. Cabinet herring, marine. (*Clupea mirabilis*.) Pacific Coast Packing Company, San Francisco, Cal.
42975. Paragon cooked herring. Pacific Coast Packing Company, San Francisco, Cal.
42974. Berger Flohm haringe. Pacific Coast Packing Company, San Francisco, Cal.
42980. Herring. Pacific Coast Packing Company, San Francisco, Cal.
42976. Sturgeon ravigotte. Pacific Coast Packing Company, San Francisco, Cal.
42978. Filet de sole, Tartar sauce (*Psettichthys*, etc.). Pacific Coast Packing Company, San Francisco, Cal.
42981. Anchovies (*Engraulis ringens*). Pacific Coast Packing Company, San Francisco, Cal.
42906. Green turtle. H. K. & F. B. Thurber & Co., New York.

ACCESSORIES TO FOOD-PREPARATIONS.

42968. Several kinds of salt. American Salt Company, San Francisco.

II. CLOTHING. (p. 147.)

3.* SKIN AND MEMBRANE.

SKINS OF FISHES.

16091. Skin of salmon, used for boots, capes, and bags. Youkon River Indians, Alaska. See page 132.
10347. Skin of codfish. Alaska.

INTESTINES.

4559. Intestines of sea-lion. Used as water-proof dresses. Northwest Coast. See page 132.

III. MATERIALS EMPLOYED IN THE ARTS AND MANUFACTURES.

12. ISINGLASS. (p. 154.)

ISINGLASS.

42921. American isinglass. C. Norwood & Sons, Manning Bros., agents, Boston, Mass.
 42990. Isinglass made from sounds of sturgeon. Schacht & Fruechtnicht, Sandusky, Ohio.

13. GELATINES. (p. 156.)

GELATINES.

42944. Fish glue, from fish and bones. Charles Alden, Gloucester, Mass.

18. FERTILIZERS. (p. 162.)

ARTIFICIAL GUANOS.

42942. Fish guano, from refuse of boneless fish. Charles Alden, Gloucester, Mass.
 42943. Fish guano, from "gurry," or refuse of fresh fish. Charles Alden, Gloucester, Mass.
 42970. Shrimp-chaff, winnowed from dried shrimps by Chinese in California, and exported to China as a fertilizer for tea-plants. The meat of the shrimp is eaten. Bay View Chinese Colony, San Francisco, Cal.

15. OILS AND FATS. (p. 157.)

FISH-OILS. (p. 160.)

Oil of other fishes.

42992. Oil from sturgeon. Schacht & Fruechtnicht, Sandusky, Ohio.

SECTION F.

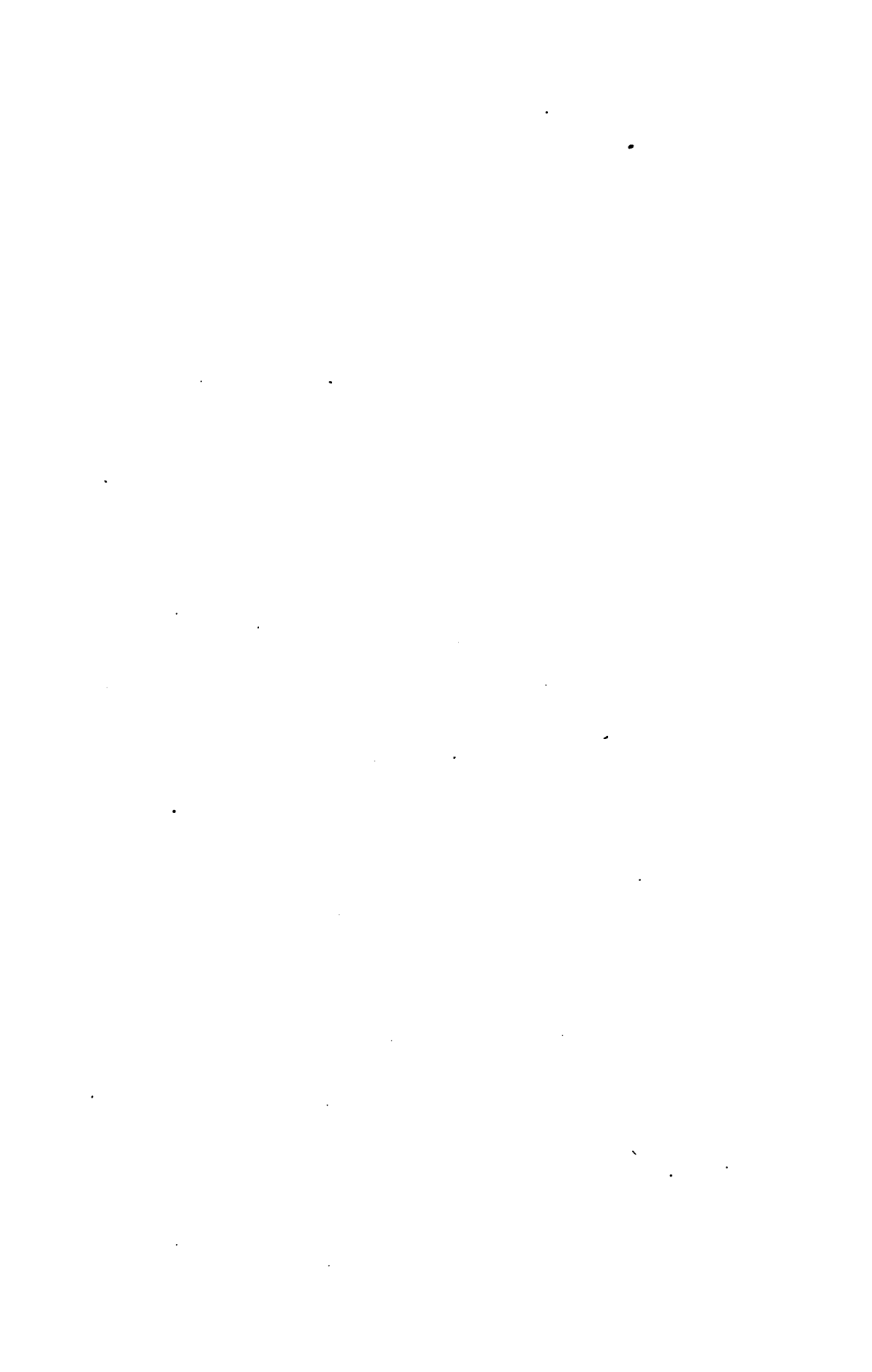
RESEARCH, PROTECTION, AND CULTURE.

III. PROPAGATION. (p. 214.)

APPARATUS USED IN THE TRANSPORTATION OF FISH. (218.)

39499. Ferguson's aerating apparatus. T. B. Ferguson. U. S. Fish Commission.

This apparatus is screwed into the top of a carrying can, and a small stream of water coming in from a tank or reservoir above draws air in through the side aperture and discharges it at the bottom of the tank, when it rises to the surface in a foam. Apparatus of this kind was used in the Boston aquarium of W. E. Baker in 1874, and by the U. S. Fish Commission in 1875 in the aquaria of its Sea-coast Laboratory at Wood's Holl, Mass. It was applied to fish-carriers by T. B. Ferguson in 1877.



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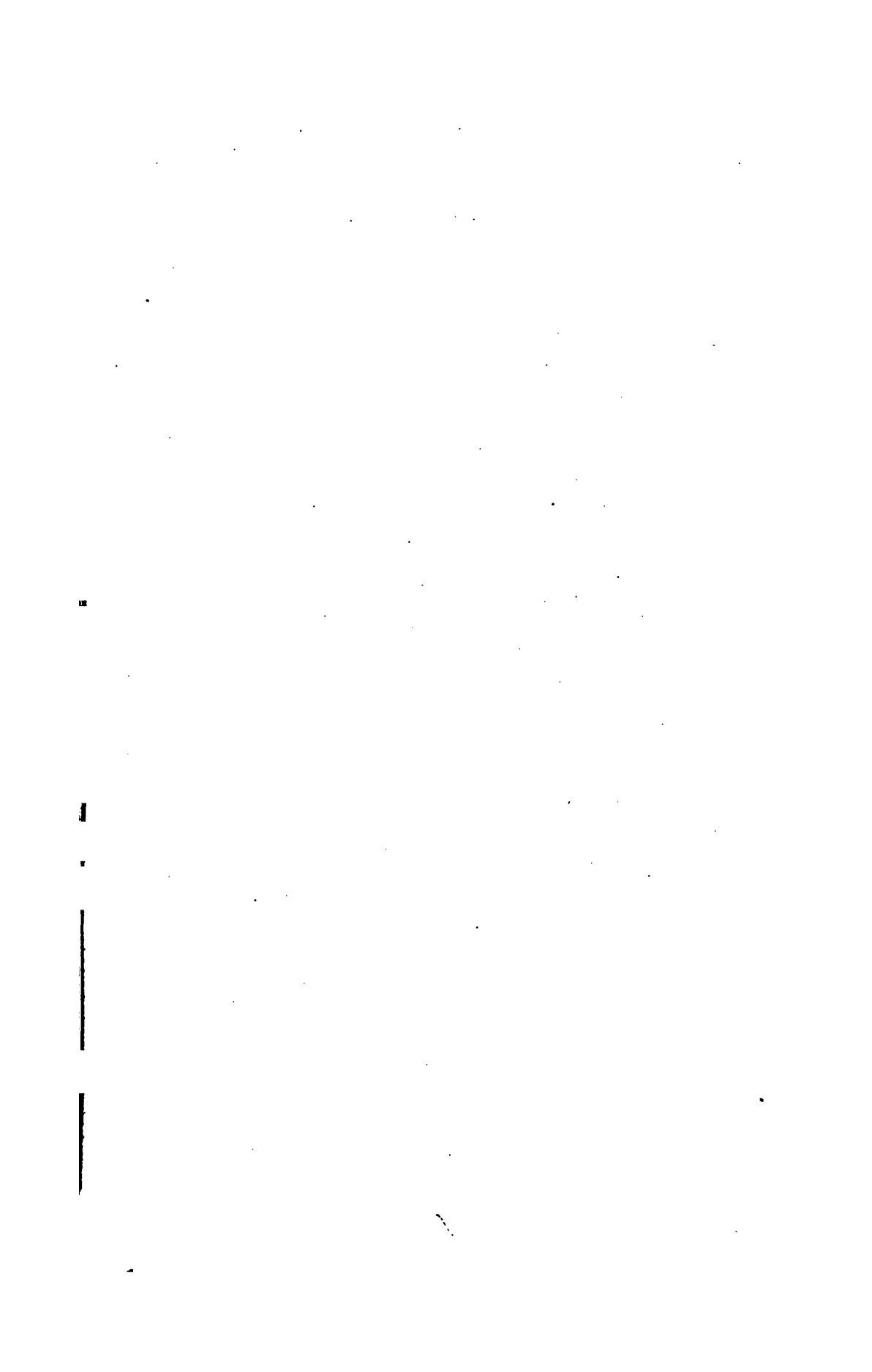
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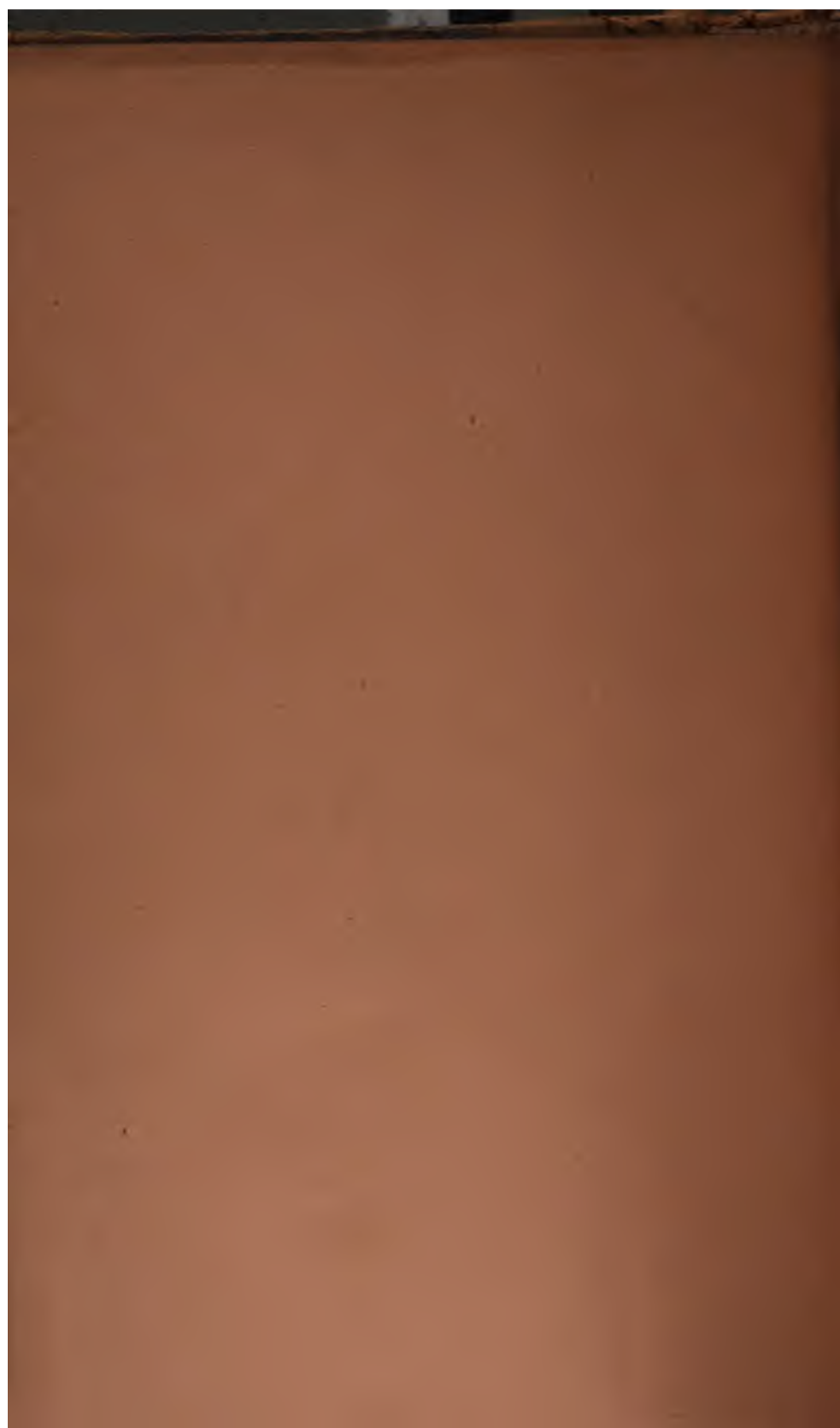
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